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STEEL

ESTABLISHED 1882

Contents

Volume 108—No. 11 **March 17, 1941**

READER COMMENTS 4
HIGHLIGHTING THIS ISSUE 19
NEWS
- Wage Demands Threaten "Profitless Prosperity" or Higher Prices 21
- International Machine Tool Corp. To Expand 22
- "Engineers Against Time" Keynote of ASME Defense Meeting 23
- Break Ground for Blast Furnace 25
- Steel Works Operations for Week 27
- Canada To Expand Shipbuilding Operations 28
- Financial News 29
- Men of Industry 30
- Activities of Steel Users, Makers 40
- Speedily Built and Built for Speed 41
- Government Defense Awards 42
- Magnesium Now Among Busiest of Metals 45
- January Exports Cut by Licenses; Imports Reach Record Low 46
- How Canton Mobilizes Resources for Defense Production 48
- Obituaries 127

WINDOWS OF WASHINGTON 32
MIRRORS OF MOTORDOM 37
EDITORIAL—Now To Beat Our Production Schedule! 52
THE BUSINESS TREND 53
TECHNICAL
- Pictorial Presentations of Operations on High-Explosive Shell—By Arthur F. Macconochie 56
- Were Eli Whitney Alive . . . He Would Be There—By Guy Hubbard 82
- Program, Annual Meeting of ASTE at Detroit 87
- Exhibitors and Products—ASTE 1941 Machine and Tool Progress Exposition 90

Joining and Welding
- Compression Cold-Riveting—By Raymond S. Osborne 64

Progress in Steelmaking
- Between Heats with Shorty 71
- Purchase of Fencing on Specification—By S. A. Bailey 74

Heat Treating
- The Effect of Nitrogen on Case Hardness 76

Materials Handling
- Don't Overlook Possibilities in Better Packaging—By Ralph F. Bisbee 79

INDUSTRIAL EQUIPMENT 95
CONSTRUCTION AND ENTERPRISE 130
MARKET REPORTS AND PRICES 109
BEHIND THE SCENES 122
HELPFUL LITERATURE 107
INDEX TO ADVERTISERS 138

PRODUCTION • PROCESSING • DISTRIBUTION • USE

5,000,000 POUND LOADS...

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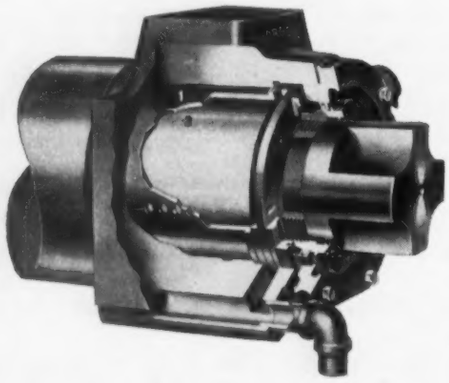
ALLOY STEELS

Bearings must take terrific poundings in high-speed rolling mills. This 44 in. bearing sleeve safely withstands pressures above 5,250,000 lbs. After years of research and experience, the MORGAN CONSTRUCTION CO., has standardized on Nickel-molybdenum steel for roll neck bearing sleeves. Nickel alloy steel retains its finish and maintains alignment.



This convention exhibit shows how Nickel alloy steel MORGOIL bearing sleeves are mounted for high speed operation in a continuous strip mill. Production economies and increased output naturally follow the increased abilities of tougher Nickel alloyed materials.

Diagram showing the ASARCOLOY bushing (marked 1) which backs up the Nickel alloy steel bearing sleeve (marked 2). Asarcoloy is a cadmium Nickel material with a very low coefficient of friction.

Confronted by tougher production schedules this year, don't get caught with your bearings down. Avoid breakdowns by specifying bearings strengthened and toughened by Nickel alloyed materials. Helpful, practical advice on efficient bearing metals and mountings is available promptly upon your request to:

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

HIGHLIGHTING THIS ISSUE OF STEEL

■ FOR a long time industry has been concerned with the administration's policy of tolerating or encouraging labor union leaders to seek higher wages on the one hand, while insisting on the other that prices must not be increased. Employers have been wondering just how far labor dealers would be permitted to strengthen their position through exploiting the existing national emergency. Current severe demands on the coal, steel and automobile industries for substantial wage increases, for closed shops and other advantages to the workers apparently are bringing this whole issue to a head. President Roosevelt **(p. 21)** last Friday intimated he would have something to say on the subject this week.

• • •

Lend-Lease Means Steel

Passage of the lend-lease bill means definitely **(p. 109)** that more and more steel and other metals will be required for the production of armament of all sorts, so that no easement of overall demand is in sight. In general, the steel industry and the manufacturers of nonferrous and alloying materials are doing a grand job in supplying consumers. But scarcities here and there undeniably are creating difficulties. Under the nickel priorities system, for example, many manufacturers who do not have defense work are worried about future supplies of stainless and other nickel alloys. This is particularly bad where substitutes cannot be used without revolutionary changes.

• • •

Canton, O., Mobilizes

Many manufacturers complain that they would like to take defense work but cannot obtain subcontracts. They are looking for a more flexible situation as a result **(p. 35)** of the appointment of district co-ordinators under the Defense Contract Service of OPM. . . . Now in the primary phase is a program **(p. 35)** for bringing in scrap from remote areas. . . . The automobile industry is planning for production of 1942 models four to six weeks earlier **(p. 37)** than last year. The new models will reflect numerous substitutions for formerly used materials. . . . Canton, O., has an effective plan **(p. 48)** for mobilizing its industrial resources. . . . Extras on shell steel **(p. 24)** are announced. . . . Steel production **(p. 27)** is at an all-time high.

• • •

Eli Whitney Would Be There

"Were Eli Whitney alive today he and his key men would be there," declares Guy Hubbard, STEEL's machine tool editor. Mr. Hubbard refers **(p. 82)** to the ASTE Machine Tool and Progress Exhibition to be held at Detroit, March 25-29. At a time when the national emphasis is so forcefully on production it is strongly urged that as many production men as can get away should visit the show and the accompanying tool engineering clinic. They will benefit by learning how to use machines more efficiently. . . . Raymond S. Osborne **(p. 64)** continues, from STEEL of March 10, his exposition of compression cold-riveting. When properly driven, cold rivets are best in many cases, he says, and gives test results to prove his contention.

• • •

Armor Plate Grinder

In this week's installment on the manufacture of high explosive shells, Prof. Arthur F. Macconochie **(p. 56)** describes shell machining methods of the S. A. Woods Machine Co., Boston. He analyzes costs of machines, tooling and accessories and brings in such other factors as required labor. . . . S. W. Poole **(p. 76)** tells of the effect of nitrogen on case hardness of such parts as automotive gears where extremely high surface hardness is required to prevent loss of dimension through wear. . . . An "armor plate" grinder **(p. 95)** is offered. . . . Ralph F. Bisbee directs attention **(p. 79)** to advantages that result from better packaging. . . . S. A. Braley **(p. 74)** reveals factors that affect quality of coating on galvanized fence.

Cylindrical Mirrors of Steel Impart Fine Finishes on Inland Cold Finished Sheets

A GREAT door opens at one end of the Inland Strip Mill Roll Shop. A heavy truck backs in, and its load, a massive roll from an Inland Cold Strip Mill, is carried away in the cables of an overhead crane. A few moments later this roll is resting in the housings of a precision grinding machine, whose grinding wheel of selected grade lightly passes back and forth across the surface of the roll. Operating the machine is a skilled craftsman especially trained to judge fine roll finishes by sight, feel and use of extremely accurate gages.

A few minutes pass and lights begin to reflect on the newly ground roll surface. Gradually by skillful manipulation of machine and grinding wheel, this massive roll has become a revolving cylindrical mirror of steel.

Dozens of these rolls are ground each day for use in the Inland Cold Rolled Strip Mills. Extra rolls are always ready for quick change, to impart the fine surface for which Inland Cold Rolled Strip and Sheets are known wherever steel is used.

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Wage Demands Threaten "Profitless Prosperity" or Higher Prices

SWOC formally asks conference with United States Steel Corp. . . . Soft coal miners demand $1 daily increase . . . Allis-Chalmers strike continues . . . State and federal mediation facilities taxed . . . President promises action on defense labor board within week

■ LABOR'S demand for wage increases, now on a wide industrial front, appears to foreshadow two alternatives: (1) A period of "profitless prosperity" for industry; or (2) the beginning of an inflationary spiral.

While corporate profits, especially in the durable goods industries, showed substantial gains in 1940 over 1939 as result of the armament program, the profit margin is too narrow to offset the added expense that would be occasioned by the wage increases demanded.

Consider the case of the United States Steel Corp. In 1940 it reported net profit of $102,181,321, highest since 1930. The Steel Workers Organizing Committee is demanding an increase of 10 cents an hour on basic wages, has refused a compromise offer of 2½ cents and has formally given notice of a request for a conference for changes in the present contract.

Asks 16 Per Cent Increase

The new wage demanded by SWOC represents an increase of 16 per cent over the present minimum of 62½ cents. If granted, it would add approximately $70,000,000 to the corporation's payroll on the basis of 1940 labor costs and presuming higher paid workers were granted commensurate increases.

Without considering other added costs that might be occasioned by other SWOC demands, such as more liberal vacations, or from inevitably higher taxes, the wage increase asked would have reduced 1940 profits to a figure barely adequate for preferred stock dividends. This probably would have left nothing for common stockholders and would have hampered seriously expansions and improvements necessitated by the national defense program.

It is improbable that stockholders would long tolerate such a situation, especially in view of the fact that they, rather than the employes, bore the brunt of the depression, a finding made public last week by the Temporary National Economic Committee.

The second alternative would be increased steel prices. Rising prices for steel—by far the most widely

Midvale Co. Workers Vote for 56-Hour Week

■ **Four thousand workers voted two to one for a 56-hour, 7-day work-week at the Midvale Co., Nicetown, Philadelphia, last week. Members of an American Federation of Labor union are shown dropping their ballots into the box, an action which will add impetus to the armament program, and increase the workers' pay checks. NEA photo**

used of raw materials in production of both armaments and civilian products—would upset the national administration's professed policy of anti-inflation.

This situation is disturbing the complacency of high government officials who have insisted on maintaining present price levels and at the same time have tolerated or encouraged labor unions to seek higher wages. It is a situation which has brought the labor problem to the forefront in the national defense program, and which now is causing government and national defense officials to advocate restrictions on union organizational activities.

Among major labor problems which must be settled in the near future are:

1. SWOC's request for higher steel wages.
2. United Mine Workers' demand for a $1 a day increase, guarantee of a minimum of 200 working days a year, and two weeks vacation with pay.
3. United Automobile Workers' request for 10 cents an hour increase and 80 hours vacation pay allowance.
4. Demands for extension of union recognition in many companies.
5. Strikes in numerous defense industries. These strikes, with a few exceptions, have not yet seriously affected defense production but have set the stage for a wave of labor troubles that might cripple the entire industrial machine.

While most observers believe the SWOC will seek some compromise agreement on steel wages, the union last week gave corporation subsidiaries formal ten-day notice of a request for conference. Under an agreement signed in February, 1938, the union and the corporation must meet within ten days of the conference notice, and unless an agreement is reached within ten days after the meeting the entire contract becomes void. This makes April 1 the deadline.

Coal Strike Threatened

April 1 also is the deadline for the threatened coal strike. United Mine Workers' contract expires March 31. President John L. Lewis has threatened to call out his workers if an agreement is not reached.

Strike threats also hang over Bethlehem Steel Co. and Ford Motor Co., two leading defense manufacturers, on the ground of nonrecognition of CIO unions. National Labor Relations Board last week ordered "immediate steps" to determine employe representation at the Ford Rouge and Lincoln plants to determine employe representation and to settle the question of a collective bargaining election. At Bethlehem, SWOC organizers threatened new walkouts unless their demands were allowed.

At Allis-Chalmers Mfg. Co., Milwaukee, the longest defense strike in the country continued despite efforts of mediation by government officials. International Harvester Co. plants in the Chicago area also continued to be harassed by stoppages.

While government officials hold strikes have not yet seriously disrupted armament production, they admit federal and state mediation facilities are seriously taxed by strikes and strike threats.

Realization of the potential dangers of the situation have caused administration officials to reverse their stands on union activities. First came recommendations for restrictions on defense strikes by William S. Knudsen, director general, Office of Production Management, and from War Department officials. Last week a joint recommendation from OPM and the Labor Department for a new labor mediation board was presented to President Roosevelt. The recommendation was for a board with 11, 7, or 5 members, representing labor, industry and the public.

At his Friday press conference, President Roosevelt intimated he would act this week on the problem. He said he would discuss the matter with William Green, president, American Federation of Labor, Sidney Hillman, associate director of OPM, and CIO'S Philip Murray.

International Machine Tool Corp. To Expand; Will Offer Stock to Public

■ AS PART of a general program to expand the activities of International Machine Tool Corp., Elkhart, Ind., arrangements are now under consideration looking to a public offering of the company's shares in the near future, it was announced last week by C. Russell Feldman, president. The registration statement is in preparation.

According to present plans, International will sell certain shares now held in its treasury to finance part of the cost of the contemplated expansion program, and to allow broader public participation in the ownership of the business, which has heretofore been privately-owned, the stockholders have agreed to sell a portion of their holdings. Upon completion of the public offering, it is expected that application will be made to list the stock on the New York exchange.

International represents an amalgamation of two well-established companies in the machine tool field, the Foster Machine Co., Elkhart, Ind., and the International Machine Tool Co., Indianapolis. The Foster company has been active in the manufacture of machine tools for the past 39 years, and International Machine Tool Co. has been engaged in the business since 1903.

The corporation is engaged in producing machine tools for domestic and export markets. It is licensed to manufacture Superfinish machines under the patents owned by Chrysler Corp. It also is a leading producer of other machine tools such as Libby turret lathes and automatic chucking lathes, which are known in the trade as "Fastermatics."

Principal customers include manufacturers of airplane engines, accessories and parts, machinery, automobiles, truck and automobile equipment, refrigerators, and railroad equipment and locomotive parts. Recent demands have made it necessary to step up operations several times.

Arrangements have been completed to open a New York office in the Chrysler building to handle sales in the metropolitan area, as well as the large and growing export demand.

Pioneer in Auto Radios

Mr. Feldman, who with E. H. Welker, Detroit, purchased a controlling interest in what is now International Machine Tool Corp. in December, 1940, is the president and treasurer. He was one of the pioneers in the development of the automobile radio industry, having served as president of the Transitone Automobile Radio Corp. before the latter company was absorbed by Philco Corp.

Mr. Welker, who has been elected executive vice president and a director of International, for the past 25 years has represented machine tool companies, including the Foster Machine Co., in Detroit. W. H. Foster, formerly president of the Foster Machine Co., is now chairman of the board of International. His nephew, Charles H. Foster, has been named assistant general manager of International, and E. J. Terry, formerly vice president of International Machine Tool Co., is vice president and general manager of the new corporation. George M. Sundheim, formerly of the old International company, has been named a director of the new corporation.

"Engineers Against Time" Keynote of ASME National Defense Meeting

■ RESPONDING to the summons of American Society of Mechanical Engineers and Army Ordnance Association, over 300 engineers, army and navy officials and production men were in session March 12-13 at Hotel Statler, Cleveland, discussing vital questions concerned with expediting the production phases of the national defense program.

This was the fourth in a series of national meetings of similar character initiated by the above mentioned organizations. Previous meetings were held at Pittsburgh, Cincinnati and New York.

Passage of the lend-lease bill just prior to the opening of the Cleveland meeting focused added attention upon it, but prevented the attendance of Gen. George C. Marshall, chief of staff, U. S. Army, and Admiral Harold R. Stark, chief of naval operations, U. S. Navy, who were to have addressed the gathering. However, many other officers were present to emphasize the needs of the army and navy, to make pleas for speed in fulfilling these requirements and to drive home the realization that in filling these requirements industry is faced with a task which dwarfs even the tremendous efforts of 1917-1918.

Defense Boundaries Expanded

Col. James L. Walsh, chairman, ASME committee on national defense, who was the speaker at the dinner Thursday evening, interpreted the vast size of the undertaking by saying that from now on it is going to be equivalent to building a city the size of Cleveland every few days. Also he brought out the fact that while a few years ago the continental boundaries of the United States as far as national defense was concerned were the shores of the oceans, today we must think in terms of the "ocean of the air" which touches every square foot of the United States no matter how far inland it may be. Development of the airplane has opened the entire continent to possible attack.

The technical sessions covered: Tank Manufacture; Ammunition Manufacture; Aviation Manufacture; Gaging Practice; Training and Recruitment of Industrial Personnel; and Subcontracting. While most of the material presented at these sessions was "off-the-record" on account of its intimate relationship to the work being carried on in ordnance plants and other defense establishments, it is possible to bring out a few of the highlights.

For example, in his paper on "Improvised Methods for Rapid Munitions Manufacture", George T. Trundle Jr., president, Trundle Engineering Co., Cleveland, made concrete recommendations on how to get into production immediately — without waiting for delivery of new production equipment which may not be available for months. Without in any way underestimating the value of this new machinery—the use of which he recommends on the more exacting operations if and when it is available—Mr. Trundle urged that idle older equipment, like older workmen, be put back into action on the kind of work which can be handled thereby.

Horizontal boring mills admittedly are scarce. Therefore, he said, recondition old lathes to do the simpler boring jobs either by making fixtures for the spindle or for the tailstock. That will leave the boring machines free to handle the work which can be done on no other machines and will help expedite the entire program.

He also advocated use of less complicated multiple setups on automatics and other multiple station machines, illustrating this by examples of "relief" of these machines through second operation work on drill presses run by new men of very limited skill. This same philosophy of subdivided, simplified operations also applies in the quick assimilation into industry of unskilled help.

The importance of this same point incidentally was emphasized by several other speakers, including Dr. Alonzo Grace, commissioner of education of Connecticut; Michael Kane, "Training Within Industry", Washington; and Lieut. B. P. Shirley, training officer, Frankford arsenal, Philadelphia.

Tooling Simplification Explained

Methods of simplifying the technique of tooling were brought out by Max Kronenberg of Cincinnati Milling Machine Co., and J. R. Longwell of Carboloy Co. Mr. Kronenberg showed a system of charts by means of which speeds, feeds, depth of cuts and horsepower quickly and easily can be determined so as to get maximum production of shells along with economical life both of high speed steel and cemented carbide tools.

Mr. Longwell urged more care in design of tools to insure quick tool changes. He cited an example where the length of time required to change tools in high production machines canceled out a large amount of the time saving effected by these machines when running.

While much has been said of the importance of machine tools in the production program, not so much has been said of gages for use on production and at inspection. As a matter of fact, the efforts being made to increase the supply of gages are almost as spectacular as those made for increasing machine tool capacity, and the labor situation in the gage industry—which demands a high proportion of highly trained toolmakers—is even more serious. During the session on gaging practice, Elmer J. Bryant, gage division, Army and Navy munitions board, Washington, told of a survey made by his division of plants throughout the United States to which it will be possible to "farm out" gage and fine tool work. Manufacturers of defense materiel who are up against that situation are urged to get lists of those plants so that the pressure on their own tool rooms can be relieved and production hastened.

Temporary Gages Satisfactory

In this connection Mr. Trundle urged the use of temporary gages of soft steel as an emergency expedient. He told of several cases where satisfactory materiel is being delivered now by companies whose regular gages may not be delivered for several months.

S. B. Terry, chief engineer, gage division, Pratt & Whitney, Hartford, Conn., and Fay Aller, chief engineer, gage and machine tool division, Sheffield Gage Corp., Dayton, O., described and illustrated the latest types of gages, including those of multiple type which indicate instantly to a girl operator whether or not the work passes muster on every one of its important dimensions. Instruments such as these enable a few inspectors to keep pace with a tremendous volume of production, as for instance on shell bodies.

The magnitude of the defense production program was well exemplified at one of the final sessions of the meeting by Tell Berna, general manager, National Machine Tool Builders' Association. It takes a five-ton, 19-foot long multiple spindle automatic 48 hours to turn out enough bullet cores to supply a machine gun for one hour's continuous firing, he said.

"That one illustration," said Mr. Berna, "is typical of the situation throughout the whole defense program. In the old days, fighting power was built up at the front; today, with war mechanized, fighting power must be built up in the factories making defense equipment. There is where the real contest is—there is where wars are won or lost!"

Lists Prices and Extras For Shell-Quality Steel

■ With passage of the lease-lend bill, steel sellers expect considerable increase in steel placements for shellmaking purposes.

This material is principally of two classifications; either a special billet, or bar stock with shell qualities. Shell steel is being produced in accordance with the requirements of the United States and British government shell steel specifications.

Base prices on the billets, which are furnished in round, round-cornered square, mosaic or gothic sections, for hot forging, are $52 per gross ton for dimensions from 3 to 12 inches exclusive; $54 per gross ton for sizes 12 to 18 inches exclusive, and $56 per gross ton for sizes 18 inches and over. The diameter of the round or the diagonal dimension of the round-cornered square, mosaic or gothic determines the size.

The above prices are net for size and shell quality but they also are subject to standard chemical extras as published in the list of extras for semifinished carbon steel, and the special quantity and cutting extras listed below.

Base prices as quoted are applicable to quantities of 1000 gross tons or more, produced for shipment to one destination at one time. For quantities less than 1000 gross tons, the following extras apply:

Gross Tons	
Under 1000 to 500 inclusive	$1.00
Under 500 to 200 inclusive	2.00
Under 200 to 100 inclusive	4.00
Under 100	on application

Cutting to length extras on this special billet stock are as follows:

Length Feet	3 to 6-inch inclusive	Over 6 inches
15 and over	Base	Base
8 to 15 exclusive	$1.00	Base
4 to 8 exclusive	2.00	$1.00
3 to 4 exclusive	3.00	2.00
2 to 3 exclusive	4.00	3.00
Under 2	On Application	

These extras are predicated on the privilege of including shorts in multiples of the customer's unit lengths.

It will be noted that the bar price enters into the shell picture in sizes under 3 inches. This is usually the case in the manufacture of smaller size shells and shell components. Steel in this classification is sold at the hot-rolled carbon steel bar price, plus $5 extra per ton for shell steel quality. All other applicable extras for size, chemistry, cutting, quantity and the like are those published in the hot-rolled carbon steel bar list.

Purchasers Sponsor Show

■ Eighty manufacturers and distributors of industrial products participated in the ninth annual exhibit sponsored by the Purchasing Agents Association of Philadelphia Inc., at the Penn Athletic club of that city, March 12 and 13. A large number of the exhibitors were identified with the iron, steel, nonferrous and metalworking industries. Attendance was more than 4000.

327 Vessels Under Construction March 1

■ Further expansion in shipbuilding is reflected in figures released by the American Bureau of Shipping, New York, which show that on March 1 a total of 327 vessels, with an aggregate gross tonnage of 1,690,328, were under construction to the bureau's classification. This compared with 276 vessels, total gross tonnage of 1,585,678 on Feb. 1, and 249 vessels, with aggregate tonnage of 1,179,240 on March 1, 1940.

Added during February were 65 vessels, with an aggregate gross tonnage of 132,835. Of the 1,690,328 gross tons of ships under construction March 1, 1,626,690 gross tons were for seagoing vessels, which numbered 195 out of the total of 327.

Priorities Not Indicated For Steel Specialties

WASHINGTON

■ Fears that formal priorities are near for stainless and specialty steels are discounted by OPM priorities officials, who assert only a tremendous defense demand, as yet unforeseen, would lead to stiffening the current preference system.

Officials said restrictions on tungsten similar to those imposed on nickel are contemplated, but will not be extended to cover finished steels. Trade apprehension is laid to a few much publicized bottlenecks which officials declare do not reveal the entire picture.

One case cited by them concerned delay in filling a 40-ton structural steel order, which was widely interpreted as a breakdown in voluntary priorities. With structural steel output running at about 350,000 tons a month, the officials declared, difficulties in sending out 40 tons only prove a near perfect record has been achieved by steelmakers.

High-Speed Steel Demand At 20,000 Tons a Year

■ L. Gerald Firth, president, Firth-Sterling Steel Co., Pittsburgh, stated last week pressure for high-speed steel will ease off when the crest of new factory openings is passed. This, because initial requirements of new plants are heavier than normal monthly needs.

Present demand, he stated, is at the rate of 20,000 tons annually, against the former peak production of 14,000 tons in 1929. This increase is largely attributable to rapid construction of new plants and will continue until all new plants are tooled. This will be the deciding factor whether there will be sufficient tool steel for normal and emergency needs.

Employment Increases Reported by OPM

WASHINGTON

■ Number of wage earners employed in steelworks, blast furnaces and rolling mills increased by 69,100 from June, 1940, to January, 1941, a gain of 14.9 per cent, according to a report last Friday by the Office of Production Management. The report, based on Department of Labor figures, revealed 533,600 were employed in January.

Employment in brass, bronze and copper industries gained 34.9 per cent in the same period, rising to 111,600, or 28,900 higher than in June. Foundries and machine shops shared in labor upturn with a gain of 81,500 employes, bringing the total to 466,700, a 21.2 per cent increase.

Machine tool industry added 16,200 wage earners. This classification included 81,000 workers in January, 25 per cent more than last June.

February Gear Sales Slightly Above January's

■ Sales of industrial gears in February were 125.8 per cent above the month in 1940 and 1 per cent higher than last January. In the first two months this year, sales were 118 per cent greater than in the corresponding period in 1940, according to the American Gear Manufacturers Association, Wilkinsburg, Pa.

Comparative index figure of sales in February was 262, against 116 in the month of 1940. In January, rate was 259; in December, 208. Index is based on 1928 as 100.

Compilation as set forth applies only to industrial gears. Automotive gears or gears used in high-speed turbine drives are not included, the association reports.

■ Heller Bros. Co., Newark, N. J., will re-open its hot bar mill about April 15 after a suspension of nine years, it was reported last week. Company has a 10-inch finishing mill and a 16-inch roughing mill and will roll both carbon and alloy steels. Conversion of semifinished steels for other companies is also planned. Capacity will be about 350 tons a week.

Break Ground for Blast Furnace, in Public Ceremony

By JOHN D. KNOX
Steel Plant Editor, STEEL

■ MANY variables which will be present in the reconstruction period following the European conflict have aroused divergent opinions as to what trend business will follow. It generally is agreed that Central and South America will consume an increasing volume of United States exports.

This fact was stated by Calvin Verity, vice president and general manager, American Rolling Mill Co., Middletown, O., at a banquet in Henry Clay hotel, Ashland, Ky., March 12, which marked the close of the Ashland Armco Expansion Celebration sponsored by the Ashland Business Men's Association.

Earlier in the day at Armco Field, many distinguished guests, including Keen Johnson, governor of Kentucky, and hundreds of Ashland's citizens witnessed the ground breaking ceremonies for the new 1100-ton blast furnace.

Merchants of the city closed their establishments and schools were dismissed in the afternoon to afford the townspeople the opportunity to attend the ceremonies.

Mr. Verity, in speaking of his company's contribution to defense efforts, referred to its new subsidiary, the Sheffield Steel Corp. of Texas, which will erect a plant at Houston. It will manufacture shell forgings, light ship plates, oil field and railroad supplies. Due to long hauls and transportation costs many steel companies are warehousing products in Texas.

"We have never done so," he stated, "but it may be possible to use the Texas plant as a warehouse for sheets rolled in Ashland and Middletown, thus enlarging our southern markets and helping to stabilize employment back home."

The possibility is further heightened, he said, because the plant is located on a 600-acre site facing the Houston ship canal which will permit the loading of export shipments on ocean-going vessels from its own docks.

Arthur G. McKee, president, Arthur G. McKee & Co., Cleveland, in speaking at the banquet said that the dedication of the new stack to the cause of peace will contribute in large measure toward securing peace and frustrating enslavement of the world. He made a plea for all industry in this country to put forth its best efforts to bring the plans of the axis powers to naught. He advocated help for Great Britain in the way of men, money and munitions.

"Let us help save the world," he said, "while it may be saved."

Outstanding features of the blast furnace project at Ashland were reported in STEEL, Feb. 24, p. 49.

■ **Calvin Verity, vice president and general manager, American Rolling Mill Co., speaking at the ceremony in Ashland, Ky.**

■ **Silver plated spade used in breaking ground for American Rolling Mill Co.'s new blast furnace in Ashland, Ky., last week, also inaugurated construction of its East Side works in Middletown, O., in 1910, and its continuous strip mill at Ashland in 1924**

Blast Furnace Capacity Up 2,000,000 Tons in 1940

■ Annual blast furnace capacity of the steel industry was increased nearly 2,000,000 tons during 1940 by an extensive program of blast furnace modernization and enlargement, according to reports made to the American Iron and Steel Institute by all blast furnace operators in the country.

No new furnaces were completed during the year, although several were under construction as the year ended and are scheduled for completion this year. As a result of these activities, by the end of the current year capacity will be in the neighborhood of 60,000,000 tons per year.

At the close of 1940, the industry's blast furnaces had capacity for producing 56,522,000 tons of coke pig iron per year, 107,000 tons of charcoal pig iron, and 981,000 tons of ferroalloys. One year before, coke pig iron capacity was 54,636,000 tons, charcoal pig iron was 96,000 tons and ferroalloys capacity was 992,000 tons. Those capacities for producing ferroalloys do not include the ferroalloy capacity of electric furnaces.

Total capacity of the nation's blast furnaces at the 1940 year-end was about 5 per cent greater than in 1918, and was close to the 1929 capacity of 57,855,000 tons.

Steelmaking capacity at present is almost 40 per cent higher than in 1918, and 15 per cent more than in 1929. Less pig iron is now needed for steelmaking than in

those earlier years, however, because of the greater use of scrap steel as a raw material.

Only 25 of the 231 blast furnaces in the country were not in operation on Dec. 31 of last year. Not only was the number of furnaces idle at the year-end the lowest on record, but also the percentage of idle blast furnace capacity was at the record low of 8 per cent of total blast furnace capacity of the industry.

Shortage in Nickel Becomes More Acute

■ Only consumers with defense contracts can be sure of obtaining nickel and nickel steels, under the priorities system, it became evident last week. Mills report the nickel situation has tightened further, with no indication of early easement.

As a result, many consumers who use nickel alloys in large quantities for civilian products are wondering what substitute material they can adopt. Included are users of stainless steel who still are operating on inventories but who will be up against a real problem when stocks are depleted. Some say they cannot use substitutes without a major revolution in their business.

Queries a manufacturer of restaurant fixtures and equipment: "Just what would you substitute for stainless steel in restaurant equipment?" He has been told he will get no more stainless steel.

Another manufacturer has been unable to find a satisfactory substitute for SAE 4340 steel for such heavy-duty parts as gears, tank drives, road machinery wearing parts and so on. There also is difficulty in finding a substitute for SAE 3115 steel for such parts as kingpins and stirring balls; in this case it is hoped that a satisfactory answer will be found in the 1040 to 1045 series, properly heat-treated.

Dow Chemical To Build Texas Magnesium Plant

■ Dow Chemical Co., Midland, Mich., has been awarded a contract by the War Department to build a magnesium metal plant at Freeport, Tex. New plant will double capacity of company's existing facilities at Freeport.

Defense Plant Corp., Reconstruction Finance Corp. subsidiary, will finance the project to the extent of $8,000,000, and will lease the plant when completed to Dow Chemical. The Dow company has under construction facilities that will cost $4,000,000, bringing total cost of the plant to $12,000,000.

Range of Deferments In Steel Shipments

■ Twenty-two steel companies recently contributed to a survey to determine delivery status of leading products. This revealed that the most extreme instance of deferred shipment, as of March 10, the official date of compilation, was ten months on galvanized sheets. However, for four companies the time for this product was three months; and for five companies, four months.

Plates ranged from three months for one company to seven months for two companies. Cold finished alloy steel bars ranged from five months to seven months.

The representative character of the survey is indicated by 43.2 per cent for cold finished carbon steel bars, to 96.9 per cent for plates, based on sales in January, 1941. Further details:

	% of Total Output for Sale, Jan. 1941
Hot-Rolled Carbon Steel Bars	
3 companies—4 months	54.2
1 company—5 months	7.6
2 companies—6 months	13.4
Total	75.2
Hot-Rolled Alloy Steel Bars	
2 companies—4 months	18.9
1 company—5 months	19.9
1 company—6 months	33.3
2 companies—7 months	12.5
Total	84.6
Cold-Finished Carbon Steel Bars	
1 company—2 months	3.4
2 companies—4 months	39.8
Total	43.2
Cold-Finished Alloy Steel Bars	
1 company—5 months	....
1 company—6 months	2.7
2 companies—7 months	55.3
Total	58.0
Structural Shapes	
2 companies—3 months	90.2
1 company—4 months	0.5
1 company—6 months	1.0
1 company—7 months	3.7
Total	95.4
Plates	
1 company—3 months	3.8
5 companies—4 months	75.0
2 companies—5 months	4.8
2 companies—6 months	6.8
2 companies—7 months	6.5
Total	96.9
Hot-Rolled Sheets	
7 companies—4 months	54.6
1 company—5 months	7.3
5 companies—6 months	29.1
Total	91.0
Galvanized Sheets	
4 companies—3 months	33.1
5 companies—4 months	52.4
1 company—10 months	5.7
Total	91.2

■ Tin Research Institute, Greenford, Middlesex, England, reports world tin production in January is estimated at 17,500 gross tons, compared with 15,100 tons in January, 1940. United States deliveries were 12,760 tons against 9780 tons in January, 1940. For 12 months ended Jan. 31 deliveries were 118,477 tons, compared with 77,346 tons in the preceding 12 months.

World stocks, including smelters' stocks and carryover, decreased 1176 tons during January to 59,806 tons at the end of the month. Stocks at the end of January, 1940, were 49,370 tons.

Offers Public Use of High-Speed Steel Patent

■ As a public service in the interest of national defense and the conservation of tungsten, the Allegheny Ludlum Steel Corp., Pittsburgh, announces its willingness to grant royalty-free, nonexclusive licenses for manufacture of its so-called DBL high-speed steel. The grant of free license covers the manufacture, use and sale of all types of cutting tools with the exception of hacksaws, bandsaws and circular saws.

This steel is covered by United States patent No. 2,212,227 of Aug. 20, 1940, which includes a number of ranges of tungsten and molybdenum content and also the combined content of these two elements. The royalty-free grant is limited to analyses within the following range: Carbon 0.60 to 0.90; manganese 0.50 maximum; silicon 0.45 maximum; tungsten 5.00 to 6.00; molybdenum 3.50 to 5.50; chromium 3.50 to 4.50; vanadium 1.25 to 1.75; phosphorus 0.03 maximum; sulphur 0.03 maximum, and the remainder iron. The percentages given are by weight.

Steelworks Operating Twenty-Four Hours a Day

■ Steel plants have generally been running 24 hours a day throughout the week to produce steel for defense and other purposes, according to the American Iron and Steel Institute.

Week-end interruptions have not been a factor in the steel industry, where lights blaze at night and work proceeds at close to capacity levels even on Saturday and Sunday.

Working shifts in steel plants have been arranged in such a way as to insure continuity of operations, yet the average number of hours worked weekly has been less than 40, despite the virtually uninterrupted use of productive facilities.

In the production of iron in blast furnaces, and in the manufacture of steel in Bessemer converters and open-hearth and electric furnaces, three shifts normally are used during each day, to maintain uninter-

rupted production. The nature of the processes makes such continuity necessary for efficient operation.

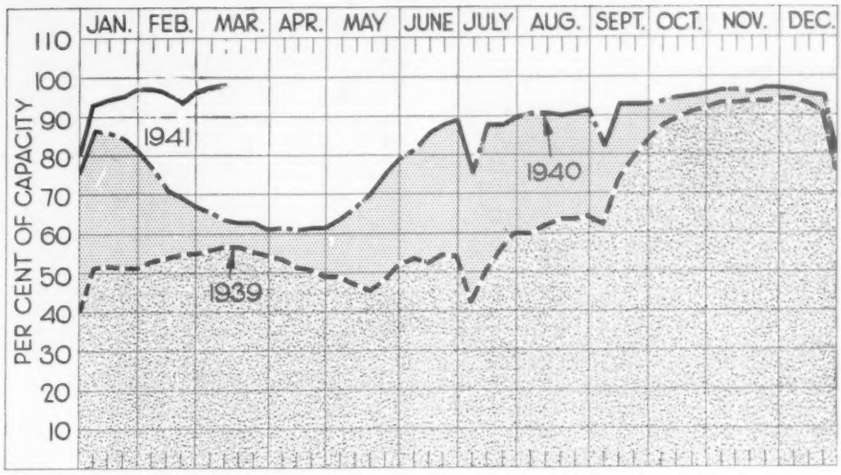
Many other steel plant operations involving the treatment of hot materials over extended periods of time must be virtually continuous, owing to the requirements of the process, as well as because of the present active demand for steel. In the rolling mills, production is usually on a week-long, 24-hour basis for maximum efficiency, as incoming orders require capacity operations.

Average Weekly Ingot Output off in February

■ Production of steel ingots and castings in February totaled 6,250,413 net tons, representing 96.8 per cent of capacity, according to the American Iron and Steel Institute. This compares with 6,943,084 tons, 97.1 per cent of capacity in January. The February total was 38 per cent greater than 4,527,141 tons made in February, 1940, at 70 per cent of capacity.

Average weekly output last month was 1,562,603 tons, against 1,567,288 tons in January and 1,093,512 tons in February, 1940.

Institute figures now include open-hearth, bessemer and electric furnace ingots and steel castings.



PRODUCTION . . . . Up

■ STEELWORKS operations last week advanced 1 point to 98½ per cent. Four districts increased their rates, three declined and five were unchanged. A year ago the average was 62½ per cent; two years ago 56½.

Youngstown, O.—Held at 97 per cent, the peak since 1929, with tonnage highest in history.

St. Louis—Steady at 93 per cent for the sixth week.

Detroit—Up 1 point to 93 per cent, necessity for furnace repair preventing a higher rate.

Cincinnati—Declined 6 points to 89 per cent as open hearths were dropped for repair by two interests which had been at capacity.

Birmingham—Continued at 90 per cent, two open hearths being out for rebuilding.

Central eastern seaboard—Advanced 1 point to 96 per cent, regaining the year's best level.

New England—Unchanged at 92 per cent for the fourth week.

Chicago—Lost 1 point, to 99 per cent, as open hearth repair became necessary. Four plants are operating at 100 per cent or higher.

Pittsburgh—Gained 2½ points to 100½ per cent.

Wheeling—Held steady at 88 per cent for the fourth consecutive week.

Buffalo—Dropped 2½ points to 90½ per cent as one open hearth was taken off for relining.

Cleveland—With two producers at capacity the rate rose 4½ points to 90 per cent.

Steel Ingot Statistics

	Estimated Production—All Companies								Calculated weekly	Number
	Open Hearth		Bessemer		Electric		Total		produc-	of
	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	tion, all companies Net tons	weeks in month
Based on Reports by Companies which in 1939 made 98.26% of the Open Hearth, 100% of the Bessemer and 34.39% of the Electric Ingot and Steel for Castings.										
1941										
Jan. ...	6,282,713	99.2	451,637	76.0	208,734	95.0	6,943,084	97.1	1,567,288	4.43
Feb. ...	5,683,104	99.3	378,330	70.5	188,979	95.2	6,250,413	96.8	1,562,603	4.00
2 Mos.	11,965,817	....	829,967	....	397,713	...	13,193,497	....	1,565,064	8.43
Based on Reports by Companies which in 1939 made 98.06% of the Open Hearth, 100% of the Bessemer and 78.15% of the Electric Ingot and Steel for Castings.										
1940										
Jan. ...	5,371,390	86.0	285,714	56.1	111,625	70.0	5,768,729	83.4	1,302,196	4.43
Feb. ...	4,219,991	72.3	205,527	43.2	101,623	68.2	4,527,141	70.0	1,093,512	4.14
2 Mos..	9,591,381	.	491,241	.	213,248	.	10,295,870	.	1,201,385	8.57
Mar. ..	4,090,224	65.5	191,559	37.6	108,307	67.9	4,390,090	63.5	990,991	4.43
1st Quar.	13,681,605	74.6	682,800	45.7	321,555	68.7	14,685,960	72.4	1,129,689	13.00
April ..	3,818,656	63.1	176,335	35.8	105,731	68.4	4,100,722	61.2	955,879	4.29
May ...	4,596,561	73.6	258,709	50.8	111,763	70.1	4,967,033	71.8	1,121,226	4.43
June ..	5,236,691	86.6	305,115	61.9	117,919	76.3	5,659,725	84.5	1,319,283	4.29
2nd Quar.	13,651,908	74.4	740,159	49.5	335,413	71.6	14,727,480	72.5	1,132,012	13.01
1st half	27,333,513	74.5	1,422,959	47.6	656,968	70.1	29,413,440	72.4	1,130,851	26.01
July ...	5,284,406	84.8	322,567	63.5	120,512	75.7	5,727,485	83.0	1,295,811	4.42
Aug. ...	5,686,755	91.0	369,770	72.6	130,761	82.0	6,187,286	89.5	1,396,679	4.43
Sept. ...	5,550,642	92.0	365,289	74.2	141,010	91.5	6,056,941	90.7	1,415,173	4.28
3rd Quar.	16,521,803	89.2	1,057,626	70.1	392,283	83.0	17,971,712	87.7	1,368,752	13.13
9 mos...	43,855,316	79.5	2,480,585	55.1	1,049,251	74.4	47,385,152	77.6	1,210,658	39.14
Oct. ...	6,076,701	97.3	408,317	80.2	158,957	99.6	6,643,975	96.1	1,499,769	4.43
Nov. ...	5,888,547	97.3	420,448	85.3	161,248	104.4	6,470,243	96.6	1,508,215	4.29
Dec. ...	5,924,325	95.1	399,434	78.6	170,090	106.9	6,493,849	94.1	1,469,197	4.42
4th Quar.	17,889,573	96.5	1,228,199	81.3	490,295	103.6	19,608,067	95.6	1,492,243	13.14
Total ..	61,744,889	83.8	3,708,784	61.7	1,539,546	81.8	66,993,219	82.1	1,281,431	52.28

The percentages of capacity for 1940 are calculated on weekly capacities of 1,410,130 net tons open hearth, 114,956 net tons Bessemer and 36,011 net tons electric ingots and steel for castings, total 1,561,097 net tons; based on annual capacities as of Dec. 31, 1939 as follows: Open hearth 73,721,592 net tons. Bessemer 6,009,920 net tons, electric 1,882,630 net tons.

The percentages of capacity for 1941 are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons Bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940 as follows: Open hearth 74,565,510 net tons, Bessemer 6,996,520 net tons, electric 2,586,320 net tons.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Mar. 15	Change	Same week 1940	Same week 1939
Pittsburgh	100.5	+ 2.5	55	50
Chicago	99	— 1	59.5	56.5
Eastern Pa. ...	96	+ 1	60	40
Youngstown ...	97	None	42	54
Wheeling	88	None	80	73
Cleveland	90	+ 4.5	73	54.5
Buffalo	90.5	— 2.5	51	33.5
Birmingham ..	90	None	78	78
New England .	92	None	70	65
Cincinnati	89	— 6	54.5	55
St. Louis.....	93	None	60	57.5
Detroit	93	+ 1	82	76
Average	98.5	+ 1	62.5	56.5

Canada To Expand Shipbuilding Program

TORONTO, ONT.

■ Substantial expansion in Canada's shipbuilding program, requiring large additions to several plants throughout the Dominion, is underway, according to C. D. Howe, minister of munitions and supply. The vessels, said Mr. Howe, will be for both Canada and the British government.

Twenty ships have already been contracted for, and orders for 10 more are to be placed immediately. Merchantmen, the ships will be of about 10,000 tons, similar to those previously ordered. Repeat orders, according to Mr. Howe, will be placed as soon as present bookings are completed.

Department of munitions and supply reported 1139 contracts placed in the week ended Feb. 28; aggregate value was $10,421,474. Orders placed with the United States companies totaled $1,062,825. Awards reported:

Shipbuilding: Canadian National Railways, Montreal, Que., $34,749; Davie Shipbuilding & Repair Co. Ltd., Montreal, $3,303,000; Marine Industries Ltd., Montreal, $2,208,000; Canadian Vickers Ltd., Montreal, $3,655,260; Brookfield Construction Co. Ltd., Halifax, N. S., $20,166; Vancouver Shipyards Ltd., Vancouver, B. C., $152,000; West Coast Salvage & Contracting Co. Ltd., Vancouver, $6082; F. Jeune & Bro. Ltd., Victoria, B. C., $6144.

Dockyard supplies: British Admiralty, England, $7000; Robert Mitchell Co. Ltd., Montreal, $11,570; Hiram L. Piper Ltd., Montreal, $8306.

Instruments: U. S. Gauge Co., Montreal, $6900; Air Ministry, England, $15,500; Instruments Ltd., Ottawa, Ont., $36,485; Ontario Hughes-Owens Co. Ltd., Ottawa, $71,969; Canadian Westinghouse Co. Ltd., Hamilton, Ont., $404,977.

Land transport: Pierre Thibault, Pierreville, Que., $6400; Mechanical Roofing Co. of Canada Ltd., Toronto, $5524; Brantford Coach & Body Ltd., Brantford, Ont., $230,906; Eastern Steel Products Ltd., Preston, Ont., $66,546; Four Wheel Drive Auto Co. Ltd., Kitchener, Ont., $29,760; Canadian Top & Body Corp. Ltd., Tilbury, Ont., $30,735; Gar Wood Industries of Canada Ltd., Windsor, Ont., $12,110.

Metals: F. Bacon & Co., Reg'd., Montreal, $11,410.

Aircraft: Air Ministry, England, $407,376; Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., $5156; Fairchild Aircraft Ltd., Longueuil, $208,448; British Aeroplane Engines Ltd., Montreal, $6380; Aviation Electric Ltd., Montreal, $11,434; Canadian Car & Foundry Co. Ltd., Montreal, $34,049; Walter Kidde & Co. of Canada Ltd., Montreal, $5289; Macdonald Bros. Aircraft Ltd., Ottawa, $5103; DeHavilland Aircraft of Canada Ltd., Toronto, $7020; Canadian Westinghouse Co. Ltd., Hamilton, Ont. $449,826; S & S Aircraft Ltd., Winnipeg, Man., $23,328.

Electrical equipment: British Admiralty, England, $5239; Canadian Marconi Co., Montreal, $14,864; R. C. A. Victor Co., Montreal, $61,700; Watson Jack & Co. Ltd., Montreal, $8086; Renfrew Electric & Refrigerator Co. Ltd., Renfrew, Ont., $28,350.

Machinery: Canadian Pratt & Whitney Aircraft Co., Longueuil, $18,369; Williams & Wilson Ltd., Montreal, $6161; George W. Crothers Ltd., Leaside, Ont., $12,750; A. Ross Osborne, Toronto, $5169.

Ordnance: Air Ministry, England, $16,400; Engineering Products of Canada Ltd., Montreal, $21,331; J. E. Lortie Co. Ltd., Montreal, $5952; Lawson Machine Works, Montreal, $18,501.

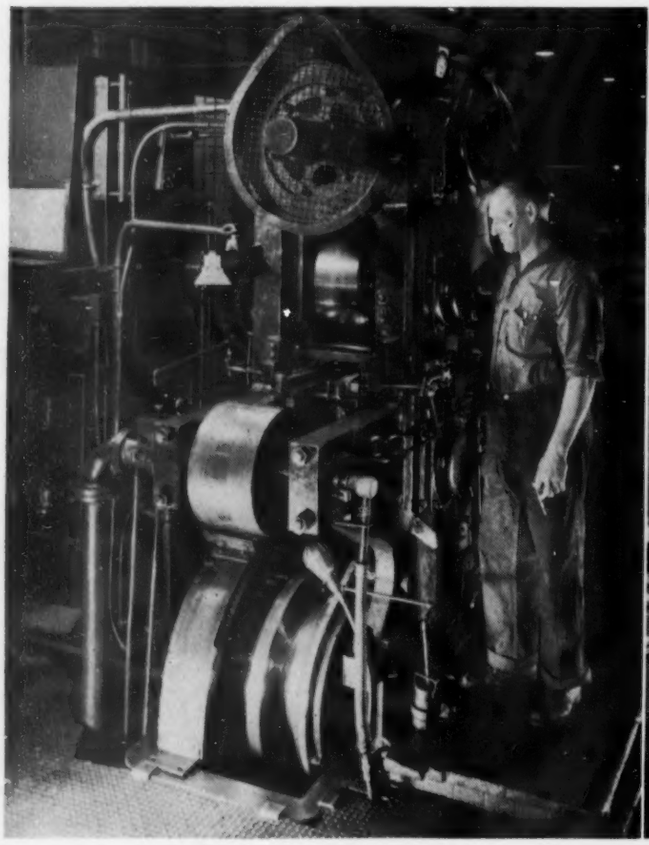
More Steel Now Used For Venetian Blinds

■ Thin cold-rolled strip steel coated with enamel is being used increasingly for the manufacture of venetian blinds, replacing the older type wood slats.

The strip is processed in coils weighing up to 300 pounds each and there are approximately 1800 feet of strip per 100 pounds of steel. Strip usually is about 0.008-inch thick; width varies from 1⅞ to 2 3/32-inches. Steel is processed to provide stiffness, spring quality and strength, and given a galvanized coating which improves resistance to corrosion and also provides a good surface for the baked enamel. Best synthetic coating materials are used to provide a finish comparable to that on automobiles.

After enameling, the strip in coil form is fed through an automatic forming and cutting machine which forms the curvature, cuts the strip to lengths and punches holes, in continuous operation. Assembled in tapes, the blinds are hung from a steel head rail.

Below at left, the narrow-gage strip is being rolled at Cuyahoga Works, Cleveland, American Steel & Wire Co., subsidiary of United States Steel Corp. At right, the finished steel venetian blind.



FINANCIAL

Steel's Rate of Return in 1940 Second Lowest, 8.5 Per Cent

■ CAPITAL goods industries made substantial gains in earnings in 1940 over 1939, a tabulation of 925 leading manufacturing companies' reports, compiled by the National City Bank, New York, reveals. Sharpest increases were in those lines stimulated by the national defense program and included iron and steel, machinery, hardware and tool, electrical and railway equipment, aircraft and parts, agricultural implements, nonferrous metal products and lumber.

Aggregate net profit for the 925 companies increased about 27 per cent from an average net return on investment of 8.4 per cent in 1939 to 10.5 per cent in 1940. Approximately 71 per cent of the companies showed higher profits in 1940 than in 1939.

Reserves against income taxes, including both the normal federal income tax, the rate on which was twice raised last year, and the new federal excess profits tax, were 145 per cent more than the 1939 reserves of the larger companies for which tax details are published.

Selected industrial groups and their return on investment in 1940 and 1939 follow:

No.	Group	Per Cent Return 1939	1940
43	Iron and steel	4.4	8.5
11	Agricultural implements	5.2	8.8
23	Building equipment	13.2	16.5
29	Electrical equipment	8.9	11.8
25	Hardware and tools	8.5	12.9
17	Household equipment	13.3	15.1
77	Machinery	8.5	13.9
10	Office equipment	10.7	13.9
7	Nonferrous metals	7.5	9.7
41	Misc. metal products	10.3	10.9
283	Total metal products	5.9	9.6
14	Automobiles	17.2	18.4
38	Auto equipment	13.0	18.1
20	Railway equipment	2.2	6.0
18	Aircraft and parts	10.2	25.7
90	Total trans. equipment	12.7	15.8

Republic Steel Corp., Cleveland, retired 10,320 shares of its 6 per cent preferred stock between Dec. 31, 1940, and Feb. 28, 1941, according to a statement filed with the Securities and Exchange Commission. Retirement was through operation of the corporation's purchase fund.

♦

Preferred stockholders of Rustless Iron & Steel Corp., Baltimore, authorized the corporation to borrow not more than $800,000 to finance installation of additional plant facilities. Proposed additions are included in an emergency plant facilities contract now under negotiation with the Navy.

♦

Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., reports net income last year was $1,677,794, equal to $14.47 per share on common. This compared with net earnings of $943,178 or $5.01 per share in 1939.

♦

McLouth Steel Corp., Detroit, steel finisher, earned $390,798 net profit in 1940. Equal to $3.91 per share on outstanding common, this compared with a net income of $296,307 or $3.21 per share in the preceding year.

♦

Block of 22,453 common shares of Allegheny Ludlum Steel Corp., Brackenridge, Pa., was offered over the counter after close of trading on the New York stock exchange, March 12. Price was $21.87½ per share. White, Weld & Co. distributed the stock, reported to represent British holdings.

♦

Revere Copper & Brass Inc., New York, reports net income in 1940 was $2,916,011, compared with $1,615,069 in the preceding year. Total of direct taxes charged against the company's earnings last year was $4,031,691; aggregate in 1939 was $1,198,688. Excess profits tax accrual in 1940 was $1,400,000.

1940 Earnings of 197 Steel Consumers Up 55 Per Cent

■ COMBINED net income of 197 iron and steel consumers in 1940 was nearly 55 per cent higher than aggregate net earnings of the same companies in 1939. Total net income for the companies last year was $352,935,648, compared with $227,742,057 in 1939. Six companies reported net losses in 1940, against 17 that incurred deficits in the preceding year. Prior tabulations in STEEL, Feb. 17, p. 26; Feb. 24, p. 28; and March 10, p. 22, included 130 companies; the accompanying compilation lists 67 consumers:

	1940	1939
Aero Supply Mfg. Co. Inc., Corry, Pa.	$554,257	$138,501
Aetna Ball Bearing Mfg. Co., Chicago	242,591	245,479
Allied Products Corp., Detroit	477,964	209,061
American Laundry Machinery Co., Cincinnati	905,388	316,424
American Radiator & Standard Sanitary Corp., New York	7,349,011	3,712,193
Athey-Truss Wheel Co., Chicago	9,649*	132,690
Atlas Imperial Diesel Engine Co., Oakland, Calif.††	227,941	140,467
Atlas Tack Corp., Fairhaven, Mass.	133,306	109,871
Babcock & Wilcox Co., New York	3,588,199	1,168,792
Bendix Home Appliances Inc., South Bend, Ind.	526,612	311,935*
Blaw-Knox Co., Pittsburgh	1,360,747	954,424
Bliss, E. W., Co., New York	1,510,799	149,044*
Brockway Motor Co. Inc., Cortland, N. Y.	223,686	212,358
Bucyrus-Erie Co., Milwaukee	2,507,223	1,752,554
Bullard Co., Bridgeport, Conn.	1,697,408	286,241
Burd Piston Ring Co., Rockford, Ill.	72,962	23,262
Burroughs Adding Machine Co., Detroit	3,146,248†	2,200,814
Central Ohio Steel Products Co., Galion, O.	166,207	164,007
City Auto Stamping Co., Toledo, O.	307,145	415,451
Clark Controller Co., Cleveland	374,449	164,459
Clark Metal Products Inc., Bridgeport, Conn.	18,630	23,501
Continental Roll & Steel Foundry Co., East Chicago, Ind.	812,454	301,269
Detroit Steel Products Co., Detroit	704,619	616,362
Dresser Mfg. Co., Bradford, Pa.	1,196,683	765,611
Eastern Malleable Iron Co., Naugatuck, Conn.	194,172	56,417
Federal Screw Works, Detroit	142,768	117,419*
Florence Stove Co., Gardner, Mass.	1,371,371	1,233,475
Foster Wheeler Corp., New York	1,003,517	91,825
General Electric Co., Schenectady, N. Y.	56,241,000	41,235,644
Geometric Stamping Co., Cleveland	8,114*	27,771*
Globe-Wernicke Co., Cincinnati	175,146	104,772
Hajoca Corp., Philadelphia	299,582	135,277
Hoover Ball & Bearing Co., Ann Arbor, Mich.	482,531	371,593
Houdaille-Hershey Corp., Detroit	2,333,086	1,487,607
International Harvester Co., Chicago§	23,161,110	7,952,810
International Safety Razor Corp., Bloomfield, N. J.	15,594	12,452
Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.	$588,104	$49,490
Kellogg Switchboard Supply Co., Chicago	303,241	218,061
Lancaster Iron Works, Lancaster, Pa.	32,476	63,543*
Link-Belt Co., Chicago	2,514,380	1,733,059
McGraw Electric Co., Chicago	1,454,933	1,413,182
Marlin-Rockwell Corp., Jamestown, N. Y.	2,432,030	1,658,084
Martin, Glenn L., Co., Baltimore	4,306,489	4,110,605
Mesta Machine Co., Pittsburgh	3,083,032	2,715,427
Metal Textile Corp., West Orange, N. J.	116,766	131,497
Morse Twist Drill & Machine Co., New Bedford, Mass.	384,820	253,512
Murray-Ohio Mfg. Co., Cleveland	250,441	227,532
Muskegon Motor Specialties Co., Muskegon, Mich.	219,904	187,613
National Malleable & Steel Castings Co., Cleveland	1,475,956	1,260,670
New Britain Machine Co., New Britain, Conn.	1,214,822	341,520
New York Shipbuilding Corp., Camden, N. J.	2,334,261	928,264
Ohio Forge & Machine Corp., Cleveland	426,516	305,334
Pittsburgh Forgings Co., Coraopolis, Pa.	468,588	293,676
Reed Roller Bit Co., Houston, Tex.	1,235,893	1,364,454
Ryan Aeronautical Co., San Diego, Calif.	358,344	90,728
Safety Car Heating & Lighting Co., New York	285,519	341,535
Seagrave Corp., Columbus, O.	29,989	9,852
Stanley Works, New Britain, Conn.	2,132,672	2,078,249
Sullivan Machinery Co., Michigan City, Ind.	564,486	69,807
Trane Co., LaCrosse, Wis.	471,685	530,533
Troxel Mfg. Co., Elyria, O.	12,058	59,643
United Aircraft Corp., New York	13,139,983	9,375,436
United-Carr Fastener Corp., Cambridge, Mass.	746,211	534,987
Veeder-Root Inc., Hartford, Conn.	991,813	900,452
Wagner Electric Corp., St. Louis	1,215,901	1,293,866
Wood, Gar, Industries Inc., Detroit	747,762	200,215
Yellow Truck & Coach Mfg. Co., Pontiac, Mich.	5,813,976	3,276,474

*Loss; §year ended Oct. 31; ††year ended Nov. 30; †parent company only.

MEN of

James K. Owen

Lee C. Wilson

Louis H. Burr

■ **JAMES K. OWEN,** the past 14 years assistant manager of Cleveland sales, Sharon Steel Corp., Sharon, Pa., has been appointed district manager in charge of the newly established sales office at 425 Chamber of Commerce building, Indianapolis, with **George S. Warren Jr. as** assistant manager.

♦

Louis H. Burr, for 17 years production manager of the Austin Co.'s steel fabricating division, has been named works manager. He succeeds the late James E. Ferguson.

♦

J. B. Cole, formerly associated with Roth Mfg. Co., Chicago, has joined the sales staff of Tool Equipment Sales Co., Chicago.

♦

Walter S. Peckinpaugh has joined the Skybryte Co., Cleveland, as sales representative for its line of maintenance paints and rust preventing products in the Cleveland territory.

♦

D. C. Gaskin has been appointed vice president and general manager, Studebaker Corp. of Canada Ltd., succeeding **M. S. Brooks** who has been transferred to an executive post with Studebaker at South Bend, Ind.

♦

Lee C. Wilson, Reading, Pa., general manager, Reading-Pratt & Cady division and Reading Steel Casting division, American Chain & Cable Co. Inc., Bridgeport, Conn., has been awarded the Frederick A. Lorenz medal by the Steel Founders' Society of America. The medal is given annually for the most outstanding contribution toward the advancement of the steel casting industry. Presentation was made at the annual meeting in Chicago, Feb. 12.

♦

John E. Kirkpatrick, vice president and treasurer, Allied Steel Products Corp., Tulsa, Okla., will return to active duty with the navy April 1.

♦

Ernest W. Smoot, vice president, Iron & Steel Products Inc., Chicago, has been placed in charge of the company's new Washington office at 902 American Securities building.

♦

Frank B. Willis, Bendix Products division, Bendix Aviation Corp., South Bend, Ind., has been elected president, Automotive Electric Association for 1941. **J. A. Shank,** Electric Auto-Lite Co., Toledo, O., has been chosen vice president and chairman of the manufacturing division; **E. A. Wildermuth,** New York, has been made vice president and chairman, distribution division; **H. E. Josselyn,** King-Seeley Corp., Ann Arbor, Mich., secretary-treasurer; **S. H. Fulton,** assistant secretary and legal counsel. **S. W. Potter,** acting executive secretary since last fall, has been named executive secretary in charge of the association headquarters in Detroit.

♦

Harry W. Faunt Le Roy, Calvert building, Baltimore, has been appointed exclusive distributor by Browning Crane & Shovel Co., Cleveland, for its line of shovels and cranes in Maryland and southern Delaware.

♦

K. P. Rolston, formerly chief engineer, Screw Machine Specialty Co., Pittsburgh, has become works manager in charge of mechanical production, Hunter Mfg. Corp., Bristol, Pa.

♦

Hugh T. Ruffner, Wellsville Iron & Metal Co., Pittsburgh, has been appointed chairman of the brokers' committee, Institute of Scrap Iron and Steel Inc., Washington. **William Rosenthal,** Hyman-Michaels Co., St. Louis, has been named vice chairman.

♦

Harvey Kaplan, M. S. Kaplan Co., Chicago, has been named chairman, railroad scrap committee, Institute of Scrap Iron and Steel Inc., Washington. **Joseph E. Jacobson,** Luria Bros. & Co. Inc., Pittsburgh, has been made vice chairman.

♦

George S. Dively, assistant treasurer, Harris-Seybold-Potter Co., Cleveland, has been elected treasurer. He has been associated with the company since 1937, and a year ago was placed in charge of the company's financial department.

♦

George M. Warner, general manager, Armco International Corp., Middletown, O., will be one of a group of 28 American industrial, financial and research executives who will leave March 17 for a 43-day "industrial exploration trip" to six South American countries.

♦

Frederic H. Leggett, treasurer and a director, Western Electric Co., New York, will retire April 1 after 43 years of service. **George B. Proud,** assistant treasurer, succeeds Mr. Leggett as treasurer.

Guy W. Vaughan, president, Cur-

INDUSTRY

James M. White

A. E. Bateson

tiss Wright Corp. and its subsidiary, Wright Aeronautical Corp., has been elected a director of Western Electric.

♦

James M. White has been appointed assistant general works manager, Allis-Chalmers Mfg. Co., Milwaukee. A graduate of Alabama Polytechnical Institute, Mr. White entered the graduate student engineering course of Allis-Chalmers in 1929. In 1935 he was named manager of the company's La Porte works.

♦

Newton P. Selover has been named western sales manager, Locomotive Equipment division, Manning, Maxwell & Moore Inc., with headquarters in Chicago. He replaces **Robert Watson,** resigned. The past seven years Mr. Selover has represented the Locomotive Equipment division on the Pacific coast, with offices in San Francisco.

♦

Gordon Packard has been promoted to the newly created position of general sales manager, International Business Machines Corp., New York. Mr. Packard was previously sales divisional manager with headquarters in Chicago.

♦

B. A. Nagelvoort has been elected president, Renown Stove Co., Owosso, Mich. He succeeds **J. E. Ellis,** who resigned last November. **Walter C. Howe** has been made secretary and treasurer, and **Frank W. Rayen,** assistant treasurer.

♦

Frank R. Johnston, the past 12 years advertising and sales promotion manager, Globe Hoist Co., Des Moines, Iowa, and Philadelphia, has opened offices as a manufacturers' representative for automotive and industrial equipment at 402 Hubbell building, Des Moines.

♦

D. R. Brehm has been appointed district manager in charge of the new St. Louis office of Bendix-Westinghouse Automotive Air Brake Co., Pittsburgh, effective April 1. The office at 718 Central Terminal building, will make contacts in the southwestern territory, formerly made through Westinghouse Air Brake Co.'s St. Louis office, and will also have jurisdiction over the Dallas and Memphis districts.

Assisting Mr. Brehm will be **Paul J. Kuffner**. Dallas and Memphis territories will be represented by **George S. Blackmore** and **William H. Parish Jr.,** respectively.

♦

A. E. Bateson, who until a year ago was manager of purchases, Allis-Chalmers Mfg. Co., Milwaukee, has retired after completing 50 years of active service with the company. Mr. Bateson was succeeded in January, 1940, by **F. E. Haker,** who was named manager of all the company's purchasing activities.

♦

E. J. McPhee has been named general superintendent, Dodge Truck division of Chrysler Corp., Detroit. Until his promotion he had been superintendent of assembly since production of Dodge trucks was started in the new Mound road plant in 1938. Before that he was chief inspector of production at the Chrysler Highland Park plant and superintendent of assembly at the Chrysler Jefferson plant.

♦

R. O. Anderson, heretofore Pittsburgh district manager, Norton Co., Worcester, Mass., has been transferred to Worcester where he will report directly to **W. R. Moore,** general sales manager. Other changes in the company's sales department include transfer of **C. B. Price** from the southeast section to district manager at Pittsburgh; **Lorin W. Grubbs,** who has been assisting Mr. Price in the eastern part of his section, will continue to serve that area, and **Zachary M. Almand** will take

E. J. McPhee

over the western part of this territory; **G. T. Taylor** has been transferred from New York city area to Chicago district; **J. S. Anderson** from Pittsburgh to New York; **W. A. Russell,** field engineer in Pittsburgh, will take over Mr. Anderson's Pittsburgh sales territory; **J. L. Tobey** becomes field engineer at Pittsburgh, and **J. E. Strachan Jr.** has been assigned as a salesman in southern Ohio.

♦

John P. Dunphy has been named general manager, Sager Lock Works division and Barrows Lock Works division, Yale & Towne Mfg. Co., North Chicago, Ill.

♦

Edgar F. Wendt, president, Buffalo Forge Co., Buffalo, has been elected president, National Association of Fan Manufacturers, Detroit. **E. Szekely,** vice president and general manager, Bayley Blower Co., Milwaukee, is vice president of the association, and **L. O. Monroe** is secretary-treasurer.

♦

Walter T. Watson, vice president, Youngstown Sheet & Tube Co., has been named general chairman for the twenty-third annual Community Chest drive at Youngstown, O., April 21 to May 5.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

New blanket rating established by priorities division . . . Employment service placements decline in January despite rearmament program . . . Government to advise contractors of contemplated changes in wage minimums . . . National charters for large corporations recommended by Senator O'Mahoney . . . OPM moves to stabilize zinc prices and supplies . . . OPM divisions offers new service to contractors

WASHINGTON

■ FIRST of a new form of blanket rating which permits recipients to obtain preferential treatment only on material specifically listed was issued last week by the priorities division of the Office of Production Management.

This rating will be granted in special cases when completion of contract on delivery date is not possible by other means.

The order differs from blanket ratings previously issued to machine tool builders, due to expire March 31.

The first order went to nine manufacturers of electric traveling cranes to speed work in shipyards and defense plants. It will help them obtain prompt delivery of motors, steel shapes and castings.

Companies that receive the rating must agree in writing to its terms before it becomes effective.

Scrap Differentials Decision Expected in Next Two Weeks

Answers to the price stabilization division's questionnaire on scrap differentials are being received from railroads, steel mills and scrap dealers. Approximately two weeks will be required to tabulate the information received, after which the division will make a formal announcement concerning the differentials.

Personnel of OPM's Steel Divisions Is Increased

Several additions to the steel unit of the production division of OPM were announced last week. They include: George F. Hocker, Bethlehem Steel Co., who will handle heavy forgings and castings; Arthur A. Wagner, Jones & Laughlin Steel Corp., who will handle structurals, plates and special steels; Arthur J. O'Leary, Lukens Steel Co., who will expedite steel deliveries in the production division for the priorities division; and James G. West, formerly of Jones & Laughlin, a specialist on blast furnaces.

Defense Contract Service To Help Primary Contractors

Field men on defense contract service are equipped with information for primary contractors who want to get in touch with subcontractors, Robert L. Mehornay, director of the service, said last week.

Pointing out that primary holders of orders can prepare for the next big wave of orders by subcontracting those they already have, Mr. Mehornay said field officers are ready to supply names of small establishments, their available machines and equipment, workers and degree of skill as well as full information on priorities, military specifications and government bids.

Unemployment Compensation Payments Rise in January

Despite the greatly increased volume of employment arising from the defense program, unemployment compensation benefits and employment service placements, during January, both showed the effects of seasonal declines in certain industries.

Reports by the Social Security Board show a 27 per cent increase in benefit payments over the previous month with total payments amounting to $39,300,000. This was, however, 4 per cent less than the amount paid in January, 1940. Job placements by State Employment Services, following the usual seasonal pattern, dropped 4 per cent below the previous month's total to 363,000. The reduction, however, was far less than the declines which occurred between December and January in past years. Moreover, January 1941 placements were 64 per cent higher than in January 1940.

Domestic Manganese Output, Shipments, Stocks Lower

Domestic production of manganese ore containing 35 per cent or more manganese (natural) during the month of January 1941 was 2100 long tons, shipments were 2200 tons, and producers' stocks at the end of the month were also 2200 tons, according to the Bureau of Mines. These figures are based on reports received from producers accounting for 87 per cent of the total in 1939.

In December, production was 3600 tons, shipments were 3500 tons, and producers' stocks at the end of the month were 2300 tons. The rate of shipments averaged 2442 tons monthly in 1939, when the total amounted to 29,307 tons.

Arkansas, Georgia, Montana, Nevada, Tennessee, and West Virginia reported shipments.

Contractors To Be Informed of Changes in Wage Minimums

A business man preparing to bid on a government contract now will know in advance whether there may be a change in the legal minimum wage of his industry by government action, and will know just when the change, if made, will go into effect, it has been announced by Donald M. Nelson, director, division of purchases, Office of Production Management.

This was worked out at a con-

Maximum production speed is largely dependent upon *faster assembly*. That's why more assembly engineers are switching to SPEED NUTS every day.

SPEED NUTS always replace two or more parts, reduce weight over 60% and more than double average assembly speed with ease. The SPEED NUT is the only one piece fastening device that affords a double spring tension lock. And what is equally important, SPEED NUTS also cut average net assembly costs 50%.

Over a billion in use—over 700 shapes and sizes. Samples and engineering data will be mailed you promptly on receipt of your engineering details.

SEE US AT BOOTH 232—MACHINE AND TOOL PROGRESS EXPOSITION, DETROIT, MARCH 25TH TO 29TH, INCLUSIVE

TINNERMAN PRODUCTS, INC. 2039 FULTON ROAD CLEVELAND, OHIO

Manufacturers of Patented SPEED NUTS

IN CANADA: Wallace Barnes Co., Ltd., Hamilton, Ontario. IN ENGLAND: Simmonds Aerocessories, Ltd., London. IN FRANCE: Aerocessoires Simmonds, S. A., Paris.

ference of officials of the wage and hour division and the division of public contracts, Department of Labor, with officers of the Quartermaster Corps and the division of purchases.

Machinery for setting industry minimum wage rates under the fair labor standards act, and for finding prevailing minimums under the Walsh-Healey act, will remain unchanged.

In the future, however, dates on which wage determinations will go into effect will be set after consultation on the part of Labor Department officials with officials of the division of purchases.

Instructions Issued for Return Of High-Grade Aluminum Scrap

Action providing for disposition of large quantities of high-grade aluminum scrap held by aircraft manufacturers has been announced by E. R. Stettinius Jr., director, priorities division of OPM.

Military airplane manufacturers were instructed last month to hold their high-grade scrap for later return to original source of supply.

In a letter sent to these manufacturers, Mr. Stettinius set forth a detailed formula under which the return of the aluminum scrap is to be made:

"1. Unpainted and unlacquered strong alloy scrap in the form of sheet clippings and mutilated sheets, tube ends and mutilated tubing and extrusion ends and mutilated extrusions shall be segregated as to alloy regardless of temper as follows: Group (a), 17S; Group (b), 17S Alclad; Group (c), 24S; Group (d), 24S Alclad; Group (e), 52S.

"Please note that Alclad products are to be separated as individual alloys.

"2. The above segregation by alloy shall be carefully and rigorously carried out so that scrap from the above aluminum alloys is clearly and unquestionably identified without chemical analysis.

"3. From the standpoint of the fabricator it is very desirable that all scrap be received for toll fabrication in briquetted form.

"4. Aluminum scrap segregated as described above shall be returned for toll fabrication to your suppliers of the original aluminum in approximate proportion to your purchases of the original aluminum from them.

"5. Any deviation from the above plan of segregation shall be worked out in conjunction with the toll fabricator.

"Aluminum scrap in forms and alloys other than those named above shall be disposed of as heretofore. Each sale shall be reported promptly in terms of weight, selling price and buyer to Frank B. Cliffe, Office 4612, Office of Production Management, New Social Security building, Washington.

"This procedure shall be continued until further notice from this office."

O'Mahoney Urges National Charters for Big Corporations

As the Temporary National Economic Committee met last week to consider its final recommendations, the chairman, Senator Joseph C. O'Mahoney, Wyoming, issued an extended statement containing his own recommendations.

There is altogether too much disposition, he said, "upon the part of men who are engaged in business to look with fear and suspicion upon the spokesmen of government and too much disposition upon the part of some spokesmen in government to denounce and criticize the acts and omissions of business executives.

"The truth is that the American standards of business ethics and of political ethics are much higher today than at any time in history and we shall not find the way out of our predicament by criticism of one another or by searching out and condemning one another's economic and political sins. The way out lies along the road of tolerance and cooperation. Certainly the manner in which every element of society is now uniting for purposes of defense is an indication of what we can do by uniting for the purposes of peace and prosperity."

Senator O'Mahoney recommended national charters for national corporations "in order that these agencies may have a definite and a free place in our economy and local business may be differentiated and protected from national business."

He also recommended the effective and thorough enforcement of the antitrust laws to maintain competition and to prevent all combinations and agreements that destroy business, and the encouragement of new business and small enterprise by revision of the tax laws.

Senator O'Mahoney suggested a national conference called by Congress of the various organizations, representative of business, labor, agriculture and consumers, which have for years been working on diverse phases of this central problem, might concentrate public thought and action on the objectives on which there is general agreement instead of, as now, on the objectives concerning which there is only misunderstanding, suspicion and disagreement.

Iron and Steel Inventories Decrease During January

Taking Dec. 31, 1938 at 100, index of the value of iron and steel products in manufacturers' inventories for January was 125.4 compared with 129.4 in December and 112 in January of last year, according to the industry survey of the Department of Commerce.

January index of the value of new orders received by iron and steel mills was 259 compared with 216 in December and 90 in January of last year, taking January, 1939 at 100.

Index of the value of iron and steel mill shipments for January was 191 compared with 195 in December and 137 in January of last year, taking January, 1939 at 100.

Value of iron and steel mill unfilled orders increased in January over December by 19 per cent, while increasing 6 per cent in December from November. Increase in January of this year over the same period of last year was 110 per cent.

OPM Moves To Stabilize Zinc Prices and Supplies

Two important steps to improve price and supply conditions in primary and secondary zinc markets were announced last week by Commissioner Leon Henderson of the price stabilization division. They were:

1. Announcement that at Mr. Henderson's request each company producing and selling primary slab zinc has pledged that during the emergency it will sell only direct to consumers or processors. This means that no new sales will be made on the Commodities Exchange and that no more primary zinc will be available for speculation.

2. A committee representing the various branches of the secondary zinc markets met with the division to advise on formulation of a concrete plan to bring prices of secondary zinc materials and products into line with the prices of the primary metal based on 7.25 cents per pound for prime western zinc at East St. Louis.

At the same time, Mr. Henderson said that he is issuing warnings to the secondary brass and copper markets, which, he said, recently have shown signs of following the same course leading to unjustified price increases which demoralized the secondary aluminum and zinc markets. He expressed the hope that secondary brass and copper dealers and processors "will learn from the unhappy examples of zinc and aluminum and consequently will maintain order and stability."

In the last few months, Mr. Henderson pointed out, producers of primary zinc have in large measure sold their product at a stable price under demand conditions which would have permitted a rising price. The price of 7.25 cents per pound, which has prevailed since last September, has been adequate to insure capacity output of primary smelters.

Need 5,000,000 Tons of Scrap from Remote Areas

■ Co-operating in a program to provide an adequate supply of iron and steel scrap, the government and the Institute of Scrap Iron and Steel Inc, Washington, are seeking means to bring in quickly 5,000,000 tons from remote areas. The tonnage is required so that steel mills and foundries may continue capacity operations to meet defense and normal civilian requirements, and to maintain "the present conservative price level of scrap," Edwin C. Barringer, the Institute's executive secretary, told Philadelphia district dealers last week.

Costs of transportation and preparation of the 5,000,000 tons, approximately one-sixth of all purchased scrap consumed annually, produce a delivered price much higher than steel mills are paying for equal grades of material in conformity with defense commission wishes. Mr. Barringer further explained that about 29,000,000 gross tons of dealer scrap plus 25,000,000 tons of home scrap will be required for capacity operations of steel mills and foundries in 1941.

Against this requirement dealers see 24,000,000 tons of scrap available from railroads, industrial plants and collections from territory normally tributary to consumers. Consumers, Mr. Barringer said, are beginning to draw on their scrap inventories, as a seasonal development. Milder weather is expected to ameliorate some of the handicaps limiting scrap movement.

Current monthly rate of consumption is in excess of 4,000,000 gross tons, an all-time record.

"Difficulty" in Obtaining Steel for Mill Equipment

■ Steel mill equipment manufacturers are experiencing difficulty, in some cases, in obtaining steel for urgently needed equipment they are building for the very producers that roll the steel.

While steel company procurement departments press for delivery of the equipment, the sales departments have declared rolling schedules will not permit shipment of the needed steel sections until a later date. The equipment manufacturer's position thus becomes apparently helpless and unenviable.

These manufacturers now are charging the producers with lack of foresight for failure to carry adequate stocks of replacement parts and equipment. Instances also are mentioned where prices on certain jobs were taken some months ago but contracts not closed until recently, despite the fact the work must be completed at an early date. In some cases installation of equipment must be completed before opening of the Great Lakes navigation season.

Manufacturers Say They Cannot Get Subcontracts

■ Numerous complaints are heard that it is difficult to get subcontracts for defense work from primary contractors.

Many manufacturers find primary contractors prefer to keep work in their own shops.

It is pointed out that production of some important armament items is held up until new plants are completed and equipped, whereas plants that already are equipped are unable to get any of it. For example, one Ohio company has a large amount of equipment suitable for production of army tanks and yet it is working only part-time because it cannot get tank business.

Because of this there is considerable interest in the organization of the Defense Contract Service with co-ordinators and engineering representatives in the principal Federal Reserve Banks throughout the country. It is felt that they are in a position to hasten production.

Seven Co-ordinators Named by Defense Contract Service

Seven co-ordinators under the Defense Contract Service of the Office of Production Management were announced last week by Robert L. Mehornay, director. Each co-ordinator will have an adequate staff of district managers, technical, engineering and financial experts who will provide decentralized assistance to companies with prime defense contracts and subcontracts, as well as potential contracts.

The co-ordinators:

Frank H. Neely, Federal Reserve Bank, Atlanta, Ga.

Raymond C. Force, Federal Reserve Bank, San Francisco.

Albert M. Creighton, Federal Reserve Bank, Boston.

George C. Brainard, chairman of the board, Federal Reserve Bank of Cleveland, and president, General Fireproofing Co., Youngstown, O. Herman H. Lind was appointed Cleveland district manager. Mr. Lind is president, American Institute of Bolt, Nut and Rivet Manufacturers, and formerly was general manager, National Machine Tool Builders Association.

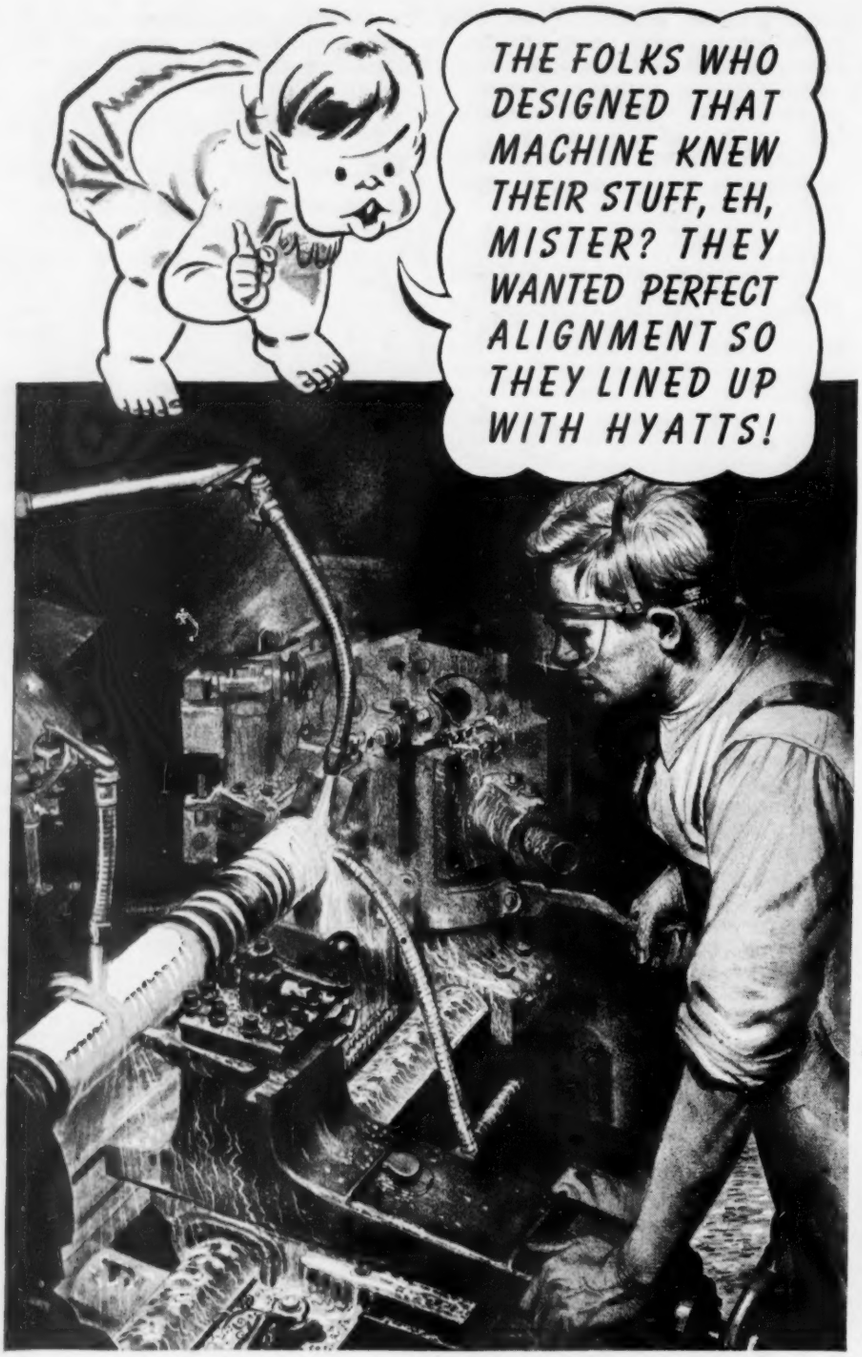
R. B. Shepard, Federal Reserve Bank, Minneapolis.

Clarence W. Avery, Detroit branch, Federal Reserve Bank of Chicago, and chairman-president, Murray Corp. of America, Detroit.

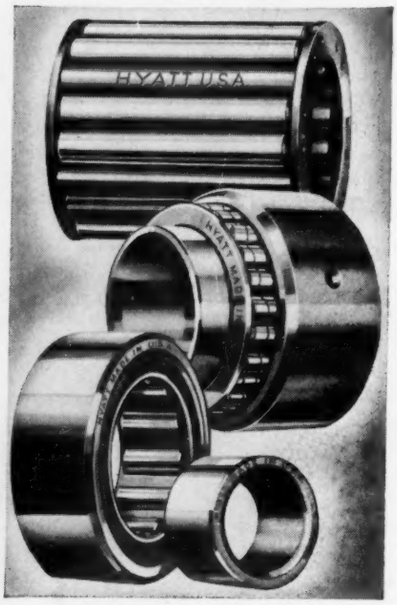
Thomas S. Gates, Federal Reserve Bank, Philadelphia.

Tests Self-Sealing Fuel Tank for Combat Planes

■ **This ponderous device simulates stresses and strains imposed on an airplane's fuel tank in flight, and is used to measure effect on the tank and its self-sealing lining. Designed by B. F. Goodrich Co., Akron, O., to test the firm's new self-sealing fuel tank, the device rocks the tank in 16 to 18 cycles a minute. Self-sealing feature, which closes holes in the wake of high-powered and large caliber machine gun bullets, is imparted by a special lining**


THE FOLKS WHO DESIGNED THAT MACHINE KNEW THEIR STUFF, EH, MISTER? THEY WANTED PERFECT ALIGNMENT SO THEY LINED UP WITH HYATTS!

A bearing for every application! Shown below: Hyatt Junior Solid Roller type, Hyatt Wound Roller type, and Hyatt Hy-Load type.



KEEP THEM YOUNG WITH HYATTS whether they be machine tools, cranes, hoists, trucks, or any other mechanical equipment you build or buy. Remember, always, that the best way to keep bearing wear and care *out* is to put Hyatts *in!* Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey; Chicago, Pittsburgh, Detroit and San Francisco.

HYATT

ROLLER BEARINGS

QUIET

Mirrors of *MOTORDOM*

By A. H. ALLEN
Detroit Editor, STEEL

Defense orders, now 38 per cent of General Motors net sales for 1940, stimulate rush to assemble new cars before production impact is felt . . . Planning for new models, six weeks ahead of schedule, must be tailored to fit new pattern because of impending shortages of materials. Industry may dispense with formal introductions altogether, overlapping 1941 and 1942 models . . . Warn of inflation shoals ahead

DETROIT

■ PASSAGE of the lease-lend bill is regarded around here as a mere formalization of what has been going on for several months in armament building plants. However, it is conceded that an immediate acceleration of production and demands for production will result, intensifying the difficulties of passenger car building and planning.

Last week Alfred P. Sloan Jr., chairman of General Motors, released a progress report on work for defense being carried out by GM. It showed that in 1940 volume of defense work totaled $60,000,000 and represented about 3½ per cent of the corporation's sales volume for the year. With three months of 1941 nearly out of the way, defense orders placed with GM have amounted to 683 millions, better than a tenfold increase over last year and amounting to about 38 per cent of 1940 sales volume.

Much the same situation is true with respect to all motor car manufacturers and in the face of it plans for the future must be hazy at best, subject to change on 24 hours' notice.

The auto industry today is like a man cutting his lawn with the thunder clouds rolling up in the distance. He pushes the mower like mad, whirls around turns, cuts corners here and there, in a frantic rush to get every last blade possible cut before the deluge breaks in its full force. Just so, assembly lines are smoking in the race against the defense deluge and against the bottom of the barrel of parts and materials.

Assemblies are eating into banks of parts, and "floats" are being trimmed down to scanty proportions. In fact, two weeks ago two of the industry's largest plants were forced to suspend operations for a day to permit parts banks to get caught up with production. Such suspensions may become increasingly frequent.

Planning for 1942 models is four to six weeks ahead of last year's schedule. Foundries are well along on stamping dies. Bills of material are expected from engineering departments shortly and parts orders then can be released. Already some steel requirements have been placed, with shipments scheduled for May. This is inferred in some quarters to indicate start of 1942 assemblies in June or July.

Gradual Changeover Likely

A cold analysis of the situation confronting motor builders today suggests there may be no definite changeover to 1942 models. In fact, new cars may not even be identified as 1942 models. More likely is a gradual changeover, with an overlapping of the two models.

For one thing, it is conceivable that a certain amount of public resentment against new models could be encountered because of fancied interference with defense activities. Some uninformed persons might say, "Well, with all the pressure on defense and the necessity for arming this country and Britain, why do the automobile people have to spend valuable time and facilities to change their models? There was nothing wrong with the 1941 models."

The problem is mainly one of merchandising — justifying announcement of new models in advertising matter. Obviously there is no interference with the defense program occasioned by new car models. Dies and tools will wear out, and the time-tested policy of yearly model changes has proved its soundness, so there is small cause to suspend it now.

More important is the fact that many changes are going to be made necessary because of materials shortages. A buyer for one of the leading auto companies, surveying a list of 14 changes in materials, complained the other day, "Well, we will soon be right back where we were 12 years ago." An exaggeration, it is true, but typical of the resigned attitude in evidence today.

So you may see a strange absence of new car previews and the attendant celebrations this year. You may see "refined" and "improved" models, different in appearance and styling but not necessarily "brand new" models in the accustomed sense of the word. Mr. Knudsen told reporters the other day that this was about all the industry did anyway at new model time, but that the public did not realize it.

Comparing design of automobiles and airplanes, a writer in a recent issue of *Fortune* observed that new automobiles are designed "by artists and publicity experts." There is more than a little truth in this charge, but, of course, it is scant recognition for the engineering milestones which can be credited to the auto industry and its suppliers.

The date of appearance of these

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"refined" models may coincide with the time when changeovers because of materials shortages will affect 1941 model assemblies. Already there is furious activity on parts changes. For example, most companies have instructed engineering departments to work out a 50 per cent reduction in the amount of zinc used—chiefly die castings. Despite reassuring statements that zinc supplies are going to be adequate for reasonable consumer requirements plus defense needs, the industry apparently has decided to take no chances.

This means that radiator grilles will go to stamped steel, either plated or covered with thin stainless steel strip, or to plastics. Of the two, the stamped steel seems the more feasible. Door handles and window regulators likewise will be changed. Ternstedt division of Fisher Body has made up some samples of stamped steel door handles for tests. They are nothing new, of course, Ford having used them for a time years ago. They are fabricated easily and compare favorably with plated die castings in strength and appearance, but do not have the "feel" of solidity that the cast handles have. To avoid plating such handles, a plastic coating, either dipped or sprayed, could be used.

Chrome belt moldings, louvers, fender decorations, headlamp bezels, window reveals, windshield frame and dividing strip may all give way to a substitute material which does not have to be plated. All these plated parts have to be plated with copper, nickel and chromium, and of these three nickel is by far the thickest. Nickel now being on priorities until Sept. 1 at least, temporary suspension of plating may be the only alternative.

Radiator cores, hitherto of brass and copper strip, likewise seem destined for change. Samples already have been made up of steel stampings, coated with a corrosion preventive.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,126
Feb.	317,520	422,225	.....
March	389,499	440,232	.....
April	354,266	452.433	.....
May	313,248	412,492	.....
June	324,253	362,566	.....
July	218,600	246,171	.....
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
Feb. 15	127,500	95,050
Feb. 22	129,240	102,570
March 1	126,550	100,855
March 8	125,915	103,560
March 15	131,620	105,720

†Comparable week.

Buying Equipment for Casting And Plating Iron Pistons

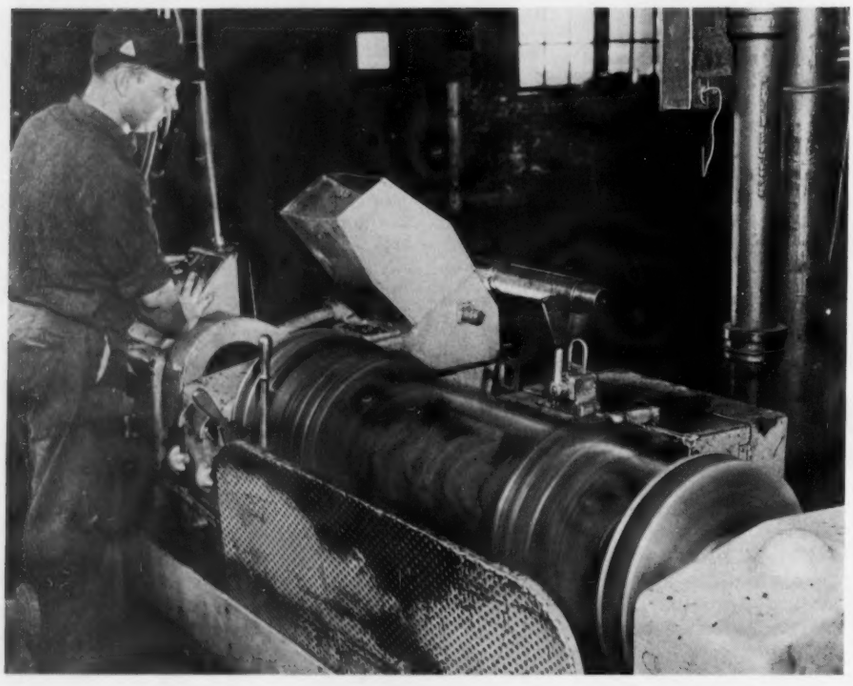
Sample cast iron pistons are being tested to replace aluminum on several models—Buick, Olds and Cadillac, for example. Electroplating equipment has been ordered for tin plating such pistons and is scheduled for delivery in a matter of weeks. Efforts are being made to place orders for sufficient tin to meet plating requirements before supplies of this metal are restricted by the government.

Buick, Olds and Cadillac piston requirements, on the basis of current assembly rates, would call for about 120,000 pistons a week—no small order even for the Buick, Pontiac and Cadillac foundries which even now are crammed with work. Pontiac conceivably could take on Olds piston requirements, but Buick probably would have to absorb its own production in the Flint foundry. Other alternatives would be to use some pearlitic malleable iron pistons supplied by the Saginaw Malleable division of GM or possibly cast steel pistons supplied by Campbell, Wyant & Cannon in Muskegon, Mich.

While both of these sources have produced pistons, they have not been for automotive engines, and B-O-C may decide to stick to known values and use cast iron which has proved satisfactory for Pontiac and Chevrolet.

At any rate, the foundries taking on these piston jobs will have to install additional molding machines and coremaking equipment, which could result in another bottleneck. Too, the equipment probably would have to be written off in a year or two, for once aluminum becomes available again, pistons in all likelihood would revert to this lighter material.

Production requirements just cited should be scaled down somewhat, for it is not at all certain that demand for new cars this summer and fall will come very close to the high level now prevailing. Anticipatory buying, price increases and more taxes will take care of that situation.

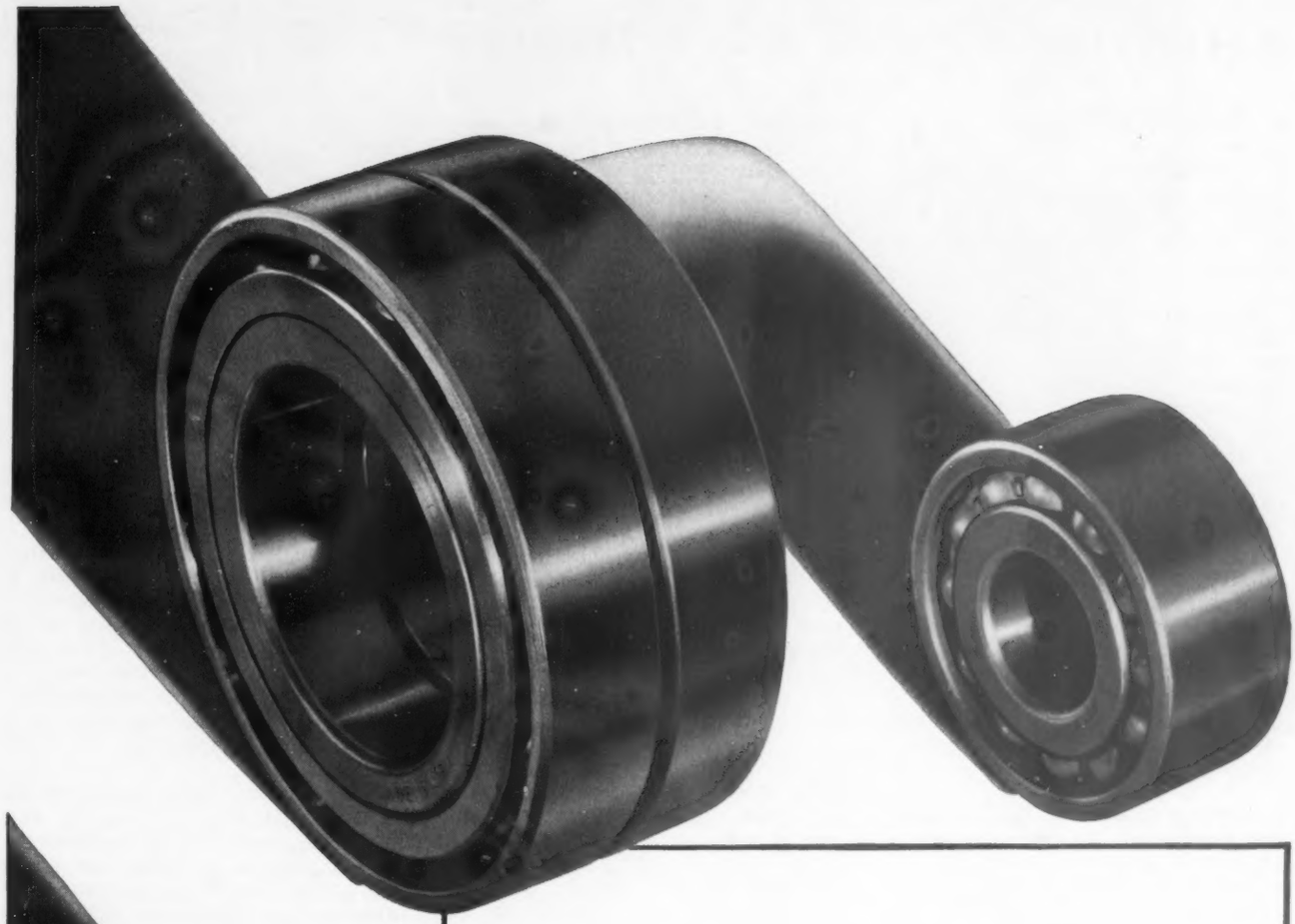


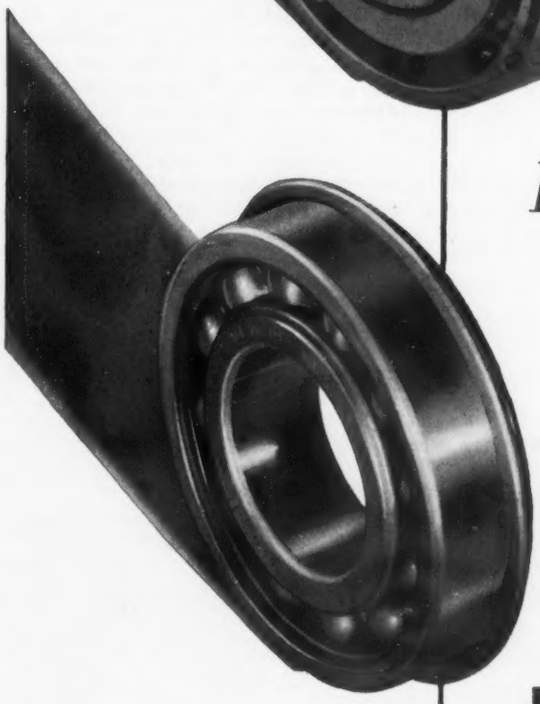
■ Mass centering of Buick crankshaft forgings is accomplished on this specially built machine. Accurate centering permits precision machining and balancing, an important first step in overall balancing of complete engines

Spread Between Wages and Cost Of Living Aids Car Sales

In explaining soaring sales of new and used cars, D. U. Bathrick, Pontiac general sales manager, mentions a factor about which little has been said recently—that is the failure (and a fortunate one) of the cost of living to climb in relation to wages. According to a "national scale of living" index, says Bathrick, a family which earned $120 a month in 1933 now earns $157.49 at the same job. In 1933 this family spent every cent of wages to live, since living expenses and wages then were on a par. Today the family is spending only

(*Please turn to Page* 84)





Bearing the Burden

of

Production under Pressure

— with the Endurance

of Forged Steel

NEW DEPARTURE

THE FORGED STEEL BEARING

New Departure - - Division of General Motors - - Bristol, Connecticut

Activities of Steel Users, Makers

■ TENNESSEE Products Corp. will double coke capacity of its plant at Chattanooga, Tenn., to provide a larger coke supply for the Alcoa, Tenn., plant of the Aluminum Co. of America. Cost is estimated at $1,800,000.

♦

National Die & Stamping Corp., Elkhart, Ind., organized a year ago, has changed its name to Quality Hardware & Machine Corp., the designation of its parent corporation in Chicago. Change was made so that all products of the two firms could be marketed under the name of the older organization.

♦

Tool Equipment Sales Co., 24 South Pulaski road, Chicago, has been appointed exclusive representative in the Chicago territory for Lempco Products Co. Inc., Bedford, O., which is entering the machine tool field by manufacturing grinding machines, hydraulic and electric arbors and straightening presses.

♦

Axelson Mfg. Co., Los Angeles, has completed the first step in its expansion program with the removal of its entire engineering department from the general administration building to a newly finished structure, 35 x 135 feet, to be devoted entirely to engineering department operations.

♦

Aluminum Co. of America, Pittsburgh, has awarded contract to Koppers Co., engineering and construction division, Pittsburgh, for design and construction of a gas producer plant and fuel and ash handling equipment at the new aluminum plant it is erecting at Alcoa, Tenn.

♦

Geo. P. Reintjes Co., Kansas City, Mo., has appointed Boiler Equipment Service Co., Atlanta, Ga., exclusive sales representative for marketing its sectionally supported walls and arches.

♦

Taylor-Wharton Iron & Steel Co. has purchased a 5-ton Pittsburgh Electromelt furnace of the latest type top-charging design, to increase production of manganese steel and other alloy castings at its High Bridge, N. J., plant. The company recently added to its forging and machining facilities at Easton, Pa.

♦

Indian Motocycle Co., Springfield, Mass., has received an order for 1000 military motorcycles of new design for the United States army. Cost, including special tools, jigs and fixtures, will be $857,000, and deliveries are expected to begin within six to nine months.

♦

National Wrought Iron Annealing Box Co., Washington, Pa., has changed its name to National Annealing Box Co. No change is contemplated in the company's organization or products.

♦

Instrument Specialties Co. Inc. has moved from 379 Main street, Little Falls, N. J., to a two-story plant at 244-248 Bergen boulevard, West Paterson, N. J. Entire plant will be used for manufacture and heat treatment of beryllium copper springs.

♦

For the third time since its manufacturing plant was established in Chicago four years ago, Ceco Steel Products Corp. has completed an addition to its facilities. This increases its capacity 50 per cent.

Electrical Manufacturers Outline 1941 Program

■ National Electrical Manufacturers Association has published a booklet outlining the organization's 1941 program under the title *What NEMA Will Do in* 1941. Described are 71 projects covering business development, business information, codes and standards, regulatory legislation and organization and management.

The program takes cognizance of the national defense program and the role electrical manufacturers are playing in rearming the country. The association points out it already has increased its activity in a number of projects concerned with defense, particularly as regards government specifications for electrical equipment.

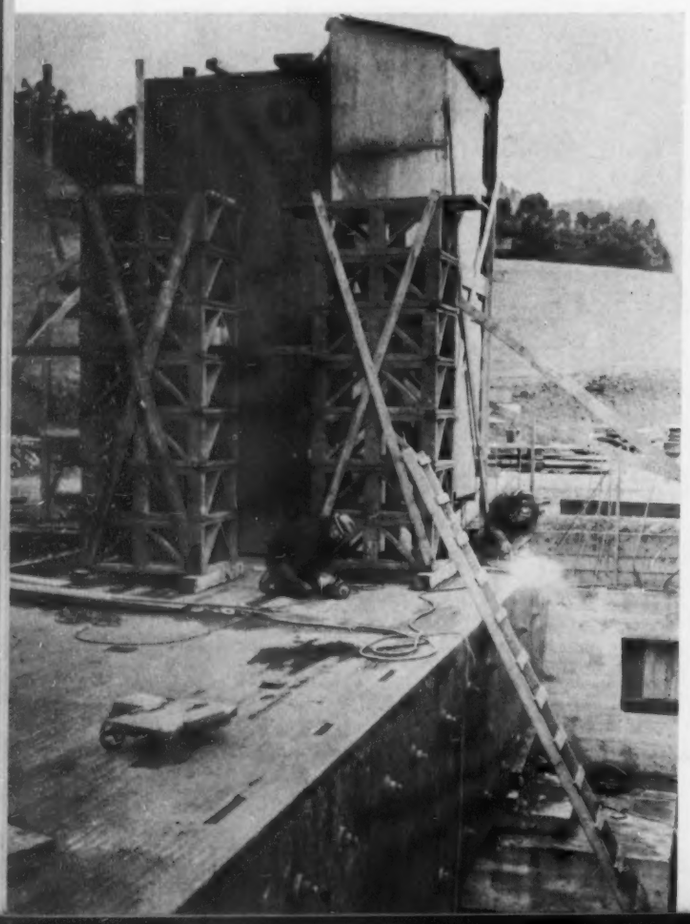
Films To Help Train Turret Lathe Operators

■ Recognizing shortage of skilled machine tool operators, Gisholt Machine Co., Madison, Wis., is sponsoring a series of sound and color motion pictures designed to aid in training workers to operate turret lathes.

"Turret Lathes—Their Operation and Place in Industry," first film of the series, demonstrates the machine's industrial applications and its operation as a typical job is turned out. Additional films will cover various types of work done on the turret lathe, set-up for different operations, and details on special types of work.

The films were planned to serve a dual purpose. First, to train turret lathe operators; second, as a long-range promotional program. Both new recruits to industrial labor and men whose skill has been dulled through disuse are expected to benefit.

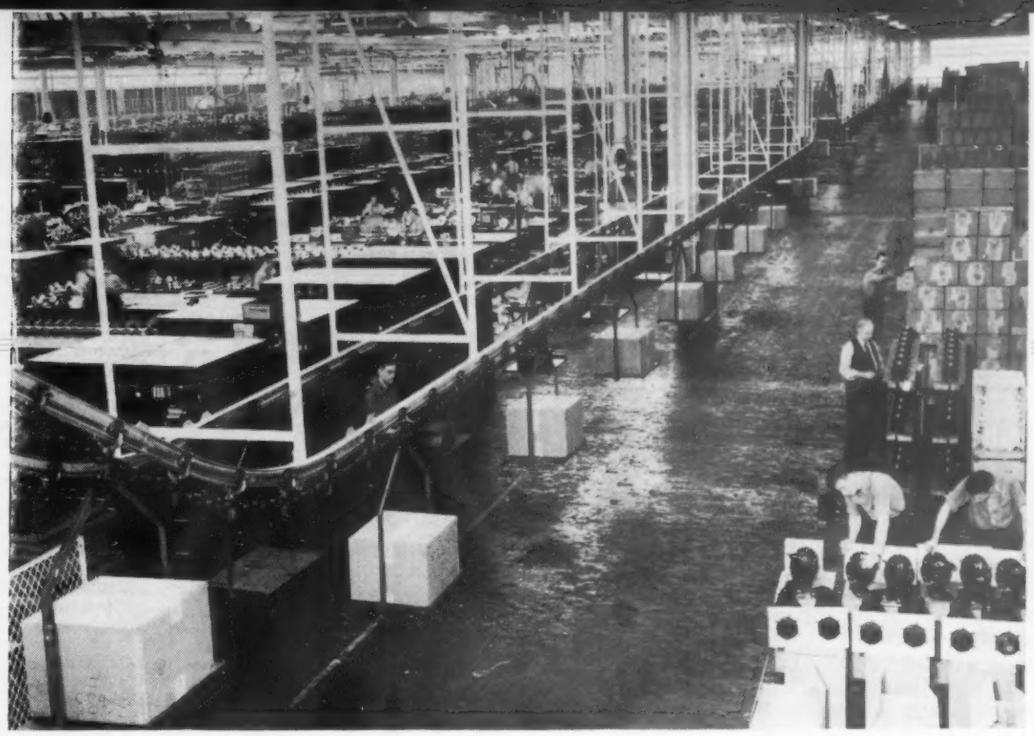
Production of the first film has been started by Burton Holmes Films Inc., Chicago, in a special studio built at the Gisholt plant. Distribution of the films will also be handled by Burton, Holmes.



♦

Cyclotron Takes 3700 Tons Steel

■ **Welded steel plates, 3 inches thick and weighing as much as 13½ tons form the base for the huge new cyclotron being erected on the University of California campus at Berkeley, Calif. The atom smasher will be completed in April and will require 3700 tons of steel, more than is used in many United States warships. NEA photo**



SPEEDILY BUILT and BUILT FOR SPEED

■ STRAIGHT-LINE production of radial air-cooled engines to power United States Army and Navy planes is employed on a large scale at the new assembly plant of Pratt & Whitney Aircraft Division, United Aircraft Corp., East Hartford, Conn. The plant is the last of four buildings added to manufacturing facilities during the past two years. It has nearly 400,000 square feet of floor space and brings the company's total factory space to 1,600,000 feet.

Work was started Sept. 5, steelwork was being erected by Oct. 16 and the plant finished by Jan. 11. Operations were shifted to the new building over a week end with no loss of production.

A feature of the plant is the modern conveyor system (above). Engine parts manufactured in other buildings converge upon the new addition for assembly into completed engines. The conveyor system, continuous and automatic, is almost a mile long and can carry a live load of 65,000 pounds at speeds of 10 to 35 feet per minute.

Under the straight-line assembly principle, parts are drawn from the store rooms as needed and distributed to the various subassembly stations. On completion a subassembly goes to one of the two "green" assembly lines (below), one for single-row and one for double-row engines, which extend down the length of the building, parallel to each other.

Farther along is the final assembly line, similarly divided for single-row and double-row production. Above each is an overhead monorail equipped with chainfalls and a series of switches. The switches make it possible to shift heavy parts up or down a line at any time, or to shunt a "slow" engine to one side temporarily and thus maintain an uninterrupted flow of production.

Week's National Defense Awards

Total $76,190,786

■ AGGREGATE of defense contracts last week reported awarded by the Departments of War and Navy was $76,190,786. Majority of contracts were small, machinery and small equipment purchases being most numerous.

War department reported award of a contract to McQuay-Norris Mfg. Co., St. Louis, for operation and management services during construction of a plant to manufacture armor-piercing cores for small arms ammunition. Unit will be located near the St. Louis small arms plant, and will produce cores for the small arms plants at St. Louis and Lake City, Mo., and at Denver. Federal government will retain title to the plant, estimated to cost $4,461,000 on a cost plus fixed fee contract basis. McQuay-Norris will operate the plant.

General Motors Corp.'s Cleveland Diesel Engine division, at Cleveland, was awarded a $3,500,000 contract by the navy for propelling machinery for 28 motor minesweepers, at $125,000 per unit. Additional work added to existing cost plus fixed fee contracts by the navy in February, and reported last week, totaled $12,132,150. Housing, storage and aviation facilities' expansions were numerous.

Department of war last week reported the following:

Ordnance Department Awards

Alco Fabricating Corp., Pawtucket, R. I., tubes, $1425.
Allen, F. H., Co. Inc., Rutherford, N. J., grinders, $1042.
Alliance Machine Co., Alliance, O., parts for hammer, $2169.
American Brake Shoe & Foundry Co., New York, castings, $30,922.50.
Apex Tool & Cutter Co. Inc., Shelton, Conn., cutters, $1269.60.
Atlas-Ansonia Co., New Haven, Conn., oilers, $20,618.40.
Bearings Co. of America, Lancaster, Pa., bearings, $2588.24.
Berger Mfg. Co., South Boston, Mass., steel lockers, $1141.56.
Bethlehem Steel Co., Bethlehem, Pa., steel, forgings, $28,357.50.
Billings & Spencer Co., Hartford, Conn., parts for hammer, $2668.66.
Boonton Machine Shop, Boonton, N. J., tools, $1210.
Bridgeport Rolling Mills Co., Stratford, Conn., gilding metal, $18,888.
Carnegie Illinois Steel Corp., South Chicago, Ill., steel, $7337.33.
Chicago Screw Co., Chicago, hardware, $1135.75.
Christiansen, C. B., Newark, N. J., tools, $6720.
Clearing Machine Corp., Chicago, presses, $50,300.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., small arms materiel, $65,583.34.
Columbus Bolt Works Co., Columbus, O.,

(*Please turn to Page* 43)

PURCHASES UNDER

(Week Ended March 1)

Iron and Steel Products	Commodity	Amount
Albert Pipe Supply Co., Brooklyn, N. Y.	Pipe, pile points	$12,392.25
American Bridge Co., Cincinnati	Structural steel	*54,368.60
American Can Co., San Francisco	Rollers	11,440.00
American Hoist & Derrick Co., St. Paul	Wire rope clips	11,615.98
American Steel & Wire Co., Cleveland	Wire roll concertinas	36,140.00
Babcock & Wilcox Co., Cincinnati	Laminated steel pressure vessels	23,620.00
Baldt Anchor Chain & Forge Corp., Chester, Pa.	Anchor chain	18,418.75
Bethlehem Steel Co., Bethlehem, Pa.	Nitriding steel, forgings, breech rings	28,732.40
Blake, W. L., & Co., Portland, Me.	Pipe couplings	15,373.00
Blickman, S., Inc., Weehawken, N. J.	Carriages	68,222.32
Butler Mfg. Co., Kansas City, Mo.	Prefabricated steel buildings	155,383.00
Chicago Vitreous Enamel Products Co., Cicero, Ill.	Enamel markers	21,200.00
Coatesville Plate Washer Co., Philadelphia	Washers	17,189.31
Columbia Steel Co., San Francisco	Steel flasks, reinforcing steel	63,286.94
Commercial Acetylene Supply Co. Inc., New York	Acetylene cylinders	11,250.00
Commercial Shearing & Stamping Co., Youngstown, O.	Tool equipment	97,008.00
Crown Can Co., Philadelphia	Cans	10,556.94
Disston, Henry, & Sons Inc., Philadelphia	Armor plates	26,200.40
Federal Stamping & Engraving Corp., Brooklyn, N. Y.	Plugs	15,900.00
Finkl, A., & Sons Co., Chicago	Forgings, breech rings	44,200.00
Flexitallic Gasket Co., Camden, N. J.	Pipe flange gaskets	22,257.00
Harrisburg Steel Corp., Harrisburg, Pa.	Gas cylinders	55,032.50
Hawaiian Plumbing & Sheet Metal Ltd., Honolulu, T. H.	Steam tables	13,932.00
Islands Welding & Supply Co. Ltd., Honolulu, T. H.	Cartridge boxes	37,975.00
Kennedy Mfg. Co., Van Wert, O.	Tool kits	66,600.00
Kidde, Walter, & Co. Inc., New York	Steel cylinders	483,779.40
Koppers Co., Bartlett Hayward division, Baltimore	Stretcher weights	13,500.00
Laclede Steel Co., St. Louis	Wire fabric reinforcement	34,722.23
Metalite Mfg. Co., Los Angeles	Sugar scoops	15,552.00
National Can Corp., New York	Paint cans	26,350.06
National Cash Register Co., Dayton, O.	Relay charge housings	214,079.80
Ohio Nut & Washer Co., Mingo Junction, O.	Washers	14,636.02
Oliver Iron & Steel Corp., Pittsburgh	Bolts for packing boxes	10,939.30
Palmer Supply Co., Seattle	Plumbing materials	13,923.70
Pittsburgh Screw & Bolt Corp., Pittsburgh	Tap rivets	*127,559.60
Republic Steel Corp., Cleveland	Steel bars, heat treated steel	*37,044.49
Roebling's, John A., Sons Co., Trenton, N. J.	Copper wire cloth	38,335.93
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.	Nuts	33,703.37
Smith, A. O., Corp., Milwaukee	Laminated steel pressure vessels	44,192.00
Southwest Welding & Mfg. Co., Alhambra, Calif.	Peg top buoys	11,196.00
Stupp Brothers Bridge & Iron Co., St. Louis	Single-span portable bridge	13,400.00
Talon Inc., Meadville, Pa.	Slide fasteners	198,934.77
Transue & Williams Steel Forging Corp., Alliance, O.	End connections	62,445.00
Tube Turns Inc., Louisville, Ky.	Shell forgings	675,296.10
Union Spring & Mfg. Co., New Kensington, Pa.	Steel springs	18,496.50
Union Wire Rope Corp., Kansas City, Mo.	Wire rope	16,056.00
United States Steel Export Co., New York	Fabricated structural steel	232,732.29
Vulcan Rail & Construction Co., Maspeth, N. Y.	Standee bunk parts	26,959.20
Wood, R. D., Co., Philadelphia	Fittings, gate valves	*23,576.25
Wright, G. F., Steel & Wire Co., Worcester, Mass.	Wire cloth	11,693.60
Wyckoff Drawn Steel Co., Pittsburgh	Steel bars	24,110.56
Nonferrous Metals and Alloys		
Aluminum Co. of America, Washington	Aluminum-alloy	$17,350.00
Aluminum Cooking Utensil Co., New Kensington, Pa.	Kettles	10,700.00
American Brass Co., Waterbury, Conn.	Cartridge brass case, cups, bullet jacket cups, rolled naval brass	2,275,893.05
American Smelting & Refining Co., New York	Ingot copper	180,505.00
Benrus Watch Co. Inc., Waterbury, Conn.	Fuse parts	105,400.00
Bridgeport Rolling Mills Co., Bridgeport, Conn.	Cartridge brass	69,482.00
General Electric Co., Schenectady, N. Y.	Parts for 24-inch searchlights	18,802.20
General Electric Supply Corp., Washington	Lighting fixtures	16,423.99
International Nickel Co. Inc., New York	Nickel-copper-alloy, nickel-chromium-alloys	128,042.00
New Haven Copper Co., Seymour, Conn.	Sheet copper	22,702.59
Pacific Metals Co. Ltd., San Francisco	Nickel-copper-alloy	110,975.00
Revere Copper & Brass Inc., Baltimore	Copper, nickel plates, cartridge brass case cups	150,976.98
Scovill Mfg. Co., Waterbury, Conn.	Cartridge brass case cups	84,000.00

WALSH-HEALEY ACT

Machinery and Other Equipment

	Commodity	Amount
Allis-Chalmers Mfg. Co., Milwaukee	Tractors	$111,690.80
American Blower Corp., Detroit	Fans, motors	31,614.00
American Type Founders Sales Corp., Washington	Rotary presses	16,661.00
Anderson, Dorsey C., Philadelphia	Welding outfits	22,200.00
Atlas Imperial Diesel Engine Co., Oakland, Calif.	Parts for engine	11,563.67
Austin-Western Road Machinery Co., Washington	Road graders	10,420.00
Axelson Mfg. Co., Los Angeles	Lathe	10,632.95
Bailey Meter Co., Cleveland	Combustion control equipment	21,608.00
Barrett Equipment Co., St. Louis	Brake equipment	71 435.00
Beardsley & Piper Co., Chicago	Molding machine	11,714.00
Blackhawk Mfg. Co., Milwaukee	Jack assemblies	264,225.00
Bliss, E. W., Co., Brooklyn, N. Y.	Draw presses	23,362.00
Bradford Machine Tool Co., Cincinnati	Lathes	268,125.00
Brown & Sharpe Mfg. Co., Providence, R. I.	Lathes	38,270.66
Bryant Chucking Grinder Co., Springfield, Vt.	Grinding machines	63,811.60
Bucyrus-Erie Co., South Milwaukee	Scrapers	33,435.00
Buda Co., Harvey, Ill.	Cylinder heads, studs, diesel engine parts	173,941.70
Buffalo Forge Co., Buffalo	Ventilation equipment, bending rolls	114,797.00
Buffalo Pumps Inc., Buffalo	Pumps	97,680.00
Caterpillar Tractor Co., Peoria, Ill.	Tractors	27,716.55
Chambersburg Engineering Co., Chambersburg, Pa.	Drop hammers	39,570.00
County Supply Co., Plainfield, N. J.	Motor maintenance equipment	10,508.16
Detroit Aluminum & Brass Corp., Detroit	Diesel engine parts	43,742.50
Diamond Power Specialty Corp., Detroit	Soot blower units	23,856.00
Elwell-Parker Electric Co., New York	Trucks, tractors	19,806.59
Engineering Products Co., Los Angeles	Mine sweeping winches	14,063.00
Ex-Cell-O Corp., Detroit	Diesel engine parts	34,856.00
Exeter Brass Works, Exeter, N. H.	Machining of spigots	17,700.00
General Machinery Corp., Hamilton, O.	Boring, turning mills	321,014.00
Gilbert & Barker Mfg. Co., Springfield, Mass.	Adapters	31,250.00
Gould & Eberhardt, Newark, N. J.	Gear machines	39,785.00
Hesse-Ersted Iron Works, Portland, Oreg.	Mine sweeping winches	24,280.00
Hobart Mfg. Co., Troy, O.	Puree mixers, food cutters	44,952.75
Ingersoll-Rand Co., New York	Pneumatic wrenches, air compressors	28,535.00
Jack & Heintz Inc., Cleveland	Hand starters	944,400.00
Lidgerwood Mfg. Co., Elizabeth, N. J.	Mine cranes	180,000.00
Link-Belt Co., Philadelphia	Sludge biofiltration plant	12,810.00
Lodge & Shipley Machine Tool Co., Cincinnati	Lathe	13,482.00
Modern Tool & Die Co., Philadelphia	Gages	57,952.00
Monarch Machine Tool Co., Sidney, O.	Lathes	12,520.36
Montgomery Elevator Co., Moline, Ill.	Modernizing freight elevator	10,528.00
New Britain Machine Co., New Britain, Conn.	Chucking machines	181,032.00
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn.	Jig boring machines	16,723.20
Norman Supply Co. Inc., Norfolk, Pa.	Taps	11,710.55
North Bros. Mfg. Co., Philadelphia	Drills	20,000.00
Ohio Metal & Mfg. Co., Dayton, O.	Sheet metal machine	21,956.78
Onan, D. W., & Sons, Minneapolis	Power units	21,715.60
Otis Elevator Co., New York	Elevator equipment, elevators	84,833.00
Parker Appliance Co., Cleveland	Tube bending machines	12,384.44
Precision Mfg. Co., Philadelphia	Gages	29,331.00
Prentiss, Henry, & Co. Inc., New York	Grinding machines	12,594.00
Quincy Compressor Co., Quincy, Ill.	Air compressors	138,084.10
Rehberger, Arthur, & Son Inc., Newark, N. J.	Hand carts	51,183.50
Rockford Machine Tool Co., Rockford, Ill.	Hydraulic shaper-planers	73,442.80
Sellers, William, & Co. Inc., Philadelphia	Milling machines	65,779.00
Snow & Petrelli Mfg. Co., New Haven, Conn.	Parts for diesel engines	180,453.25
Standard Gage Co. Inc., Poughkeepsie, N. Y.	Plant facilities	150,000.00
Stedfast & Roulston Inc., Boston	Boring mill	24,864.00
Stokes, F. J., Machine Co., Philadelphia	Rotary presses	11,550.00
Sullivan Machinery Co., Michigan City, Ind.	Air compressors	92,620.00
Thurston Mfg. Co., Providence, R. I.	Mills, cutters	17,186.70
Vickers Inc., Waterbury Tool division, Waterbury, Conn.	Variable transmissions	54,657.84
Vulcan Iron Works, Wilkes-Barre, Pa.	Locomotive	71,009.00
Warner & Swasey Co., Cleveland	Turret lathes	66,512.00
Weddle, J. H., Monrovia, Calif.	Embankment material	31,400.00
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.	Blowers	48,700.00
Whiton, D. E., Machine Co., New London, Conn.	Turbogenerating sets	17,108.00
Wilson, K. R., New York	Arbor press	15,128.00
Woods, S. A., Machine Co., Boston	Shell	2,347,344.00
Worthington Pump & Machinery Corp., Washington	Air compressors	32,447.00
Yellow Truck & Coach Mfg. Co., Pontiac, Mich.	Tractor-trucks	19,814.64

*Estimated.

Defense Awards

(*Concluded from Page 42*)

track wedges, $8625.

Cowles, C., & Co., New Haven, Conn., reflectors and oilers, $13,615.90.

Crannell, Nugent & Kranzer Inc., New York, triple braid wire, $1360.42.

Crucible Steel Castings Co., Milwaukee, castings, $1880.98.

Curtiss-Wright Corp., Curtiss Airplane division, Buffalo, power feed units, $15,012.99.

Detroit Broach Co. Inc., Detroit, broaches, $4966.15.

Eclipse Air Brush Co. Inc., Newark, N. J., painting and drying machines, $5036.15.

Eisler Engineering Co., Newark, N. J., spot welder machines, $1950.

Ex-Cell-O Corp., Detroit, cutters, $1257.56.

Ferracute Machine Co., Bridgeton, N. J., clutch shaft lever, $1500.

General Motors Corp., Hyatt Bearings division, Harrison, N. J., roller bearings, $3733.80.

Graham Industrial Supply Co., Lodi, N. J., drills, $2701.94.

Graybar Electric Co. Inc., New York, electrical equipment, wire, $11,260.31.

Hanson-Van Winkle-Munning Co., Matawan, N. J., chrome plating equipment, $3645.95.

Hanssen's, Louis, Sons, Davenport, Iowa, hardware, $9680.59.

Hardinge Bros. Inc., Elmira, N. Y., milling machines, $2396.

Hayes, Charles E., Co., Springfield, Mass., lighting fixtures, $1012.80.

Johnson, Justus, Hartford, Conn., dies, $1244.25.

Lewis-Shepard Sales Corp., Watertown, Mass., lift trucks, storage racks, $4987.50.

Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, $2694.

Lynch, E. A., Machinery Co., Green Bay, Wis., drill presses, $2160.

Magna Mfg. Co. Inc., Haskell, N. J., magnesium, $224,623.50.

Mayer, Albert E., Springfield, Mass., iron pipe and brass water lines, $1552.37.

McGill Mfg. Co., Valparaiso, Ind., ball bearings, $8366.

Metal & Thermit Corp., Jersey City, N. J., electrodes, $3585.

Metalwash Machine Co., Newark, N. J., washing machines, $4735.

Multi-Products Tool Co., Newark, N. J., tools, $7300.

Parker Rust Proof Co., Detroit, "parkerizing" equipment, $2386.50.

Republic Steel Corp., Cleveland, steel, castings, $66,441.84.

S. K. F. Industries, Philadelphia, ball bearings, $4372.95.

Sowers Mfg. Co., Buffalo, mixing kettles, $4250.

Stromberg Time Corp., Philadelphia, time clock equipment, $1175.

Suburban Essex Machinists Inc., Orange, N. J., tools, $2215.

Sunstrand Machine Tool Co., Rockford, Ill., drilling and centering machines, $7122.

Titan Metal Mfg. Co., Bellefonte, Pa., fuse rings, $315,000.

Transue & Williams Steel Forging Corp., Alliance, O., end connections for track, $62,445.

Tungsten Electric Co., Union City, N. J., tools, $2658.60.

Union Twist Drill Co., Athol, Mass., reamers, $1074.

Unique Specialties Co., New York, tools, $6247.20.

Vinco Corp., Detroit, gages, $6375.60.

Warner & Swasey Co., Cleveland, lathes, $27,689.

Weinstein, S., Supply Co., New York, hardware, $2857.53.

Western Cartridge Co., Winchester Repeating Arms Co. division, New Haven, Conn., small arms materiel, $3463.13.

Wolf Co., Chambersburg, Pa., complete

drill assemblies, $272,779.60.

Corps of Engineers Awards

Aermotor Co., Chicago, triangulation towers, $13,022.

Aqua Systems Inc., New York, construction of air corps gasoline fueling system, Godman field, Ft. Knox, Kentucky, $46,668.

Bass Engineering & Construction Co., Detroit, sewage pumping station, Westover field, Chicopee Falls, Mass., $19,600.

Bass, Joseph A., Co., Minneapolis, construction of temporary housing, army air base, Ft. Wayne, Ind., airport, $782,355.

Caterpillar Tractor Co., Peoria, Ill., generating sets, $3629.84.

Chicago Bridge & Iron Co., Chicago, construction of steel standpipe, Manchester, N. H., airport, $14,640; construction of elevated water tank, Tucson, Ariz., municipal airport, $61,290.

Dawkins, C. T., Tampa, Fla., construction of radio beacon range building, MacDill field, Florida, $3583.

Goode Construction Co., Charlotte, N. C., extension of housing facilities, Savannah airport, Georgia, $525,500.

James, T. L., & Co. Inc., Ruston, La., construction of temporary housing, Oklahoma City air base, Oklahoma City, Okla., $1,458,828.

Lambie, James B., Co. Inc., Washington, bench grinders, $490.80.

Le Roi Co., Milwaukee, repair parts for compressors, $51,367.38.

Muskogee Iron Works, Muskogee, Okla., fabricated steel for aircraft assembly plant, Kansas City, Kans., $343,490.

NePage Electric Co., Seattle, night lighting system, McChord field, Washington, $27,840.

O. K. Clutch & Machinery Co., Columbia, Pa., hoists, $4689.

Pittsburgh-Des Moines Steel Co., New York, construction of steel standpipe, Bangor, Me., airport, $32,700.

Saltzman, J. G., Inc., New York, enlargers, $7020.

Service Plumbing & Heating Co., Williamsburg, Va., water lines and plumbing, Langley field, Virginia, $78,200.

Southeastern Construction Co., Charlotte, N. C., construction of fire station, Langley field, Virginia, $7998.

Sperry Gyroscope Co. Inc., Brooklyn, N. Y., repair parts for searchlights, $1093.10.

Standard Automotive Supply Co. Inc., Washington, drill presses, $380.40.

Sullivan, D. A., & Sons Inc., Northampton, Mass., construction of hangar and other temporary buildings, at Manchester, N. H., airport, and at Bangor, Me., airport, $595,606.

Tellepsen Construction Co., Houston, Tex., water, sewer system, Ellington field, Texas, $319,967.94.

Medical Corps Awards

Becker, Christian, Inc., New York, laboratory equipment, $10,149.

Electric Heat Control Apparatus Co., Newark, N. J., bacteriological incubators, $5033.10.

Picker X-Ray Corp., New York, lead lined cassettes and film storage chests, $38,250.

Precision Scientific Co., Chicago, laboratory equipment, $30,456.

Rex Cutlery Corp., New York, scissors, $5880.

Westinghouse Electric & Mfg. Co., Westinghouse X-Ray division, New York, processing units, $32,718.65.

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Navy department reported the following:

Bureau of Supplies and Accounts Awards

Alloy Rods Corp., York, Pa., welding electrodes, $378,820.

Aluminum Co. of America, Pittsburgh, aluminum alloy ingots, $159,462.

American Brass Co., American Metal Hose branch, Waterbury, Conn., flexible metallic hose, $143,322.50.

American Car & Foundry Co., New York, flat, steel underframe cars, $31,500.

American Chain & Cable Co. Inc., Wright Mfg. division, York, Pa., electric hoists, $14,313.48; Page Steel & Wire division, Monessen, Pa., welding electrodes, $245,400.

Anaconda Sales Co., New York, slab zinc, (spelter) $12,375.

Arcos Corp., Philadelphia, welding electrodes, $124,350.

Baldt Anchor, Chain & Forge Co., Chester, Pa., anchor chain, links, shots and tool sets, $84,455.50.

Barnes Mfg. Co., Mansfield, O., bronze pipe, flanges, $82,686.30.

Bendix Aviation Corp., Pioneer instrument division, Bendix, N. J., sextants, $129,865.

Benn Supply Co., Jersey City, N. J., steel, lap welded or seamless pipe, $14,588.67.

Blickman, S., Inc., Weehawken, N. J., straddle stands, $35,800.

Bostitch Inc., East Greenwich, R. I., paper fastening machines and staples, $23,850.

Bradford Machine Tool Co., Cincinnati, engine lathe, $5230.

Bryant Machinery & Engineering Co., Chicago, upright drills, $6610.

Buda Co., Harvey, Ill., marine diesel engines, $15,704.63.

Bullard Co., Bridgeport, Conn., turret, vertical lathes, $39,498.45.

Chandler-Evans Corp., South Meriden, Conn., engine-driven fuel pumps, $36,-030.

Chapman Valve Mfg. Co., Indian Orchard, Mass., composition valves, $5665.

Chicago Metal Hose Corp., Maywood, Ill., flexible metallic hose, $21,606.

Clyde Iron Works Inc., Duluth, steam windlasses, double drum steam-driven winches, $41,945.

Condenser Service & Engineering Co. Inc., Hoboken, N. J., drain collecting units, $35,207.

Crane Co., Chicago, high pressure and steel cast valves, $48,349.50.

Crucible Steel Co. of America, New York, welding electrodes, $69,280.

Eagle Mfg. Co., Wellsburg, W. Va., steel fillers and oilers, $16,548.

E. A. Laboratories Inc., Brooklyn, N. Y., electric horns, $8472.75.

Electronic Laboratories Inc., Indianapolis, inverters for selsyn instruments, $12,000.

Elgin National Watch Co., Elgin, Ill., Elgin timers, $11,025.

Elliott Co., Ridgway, Pa., main motor armatures, $45,200.

Ellis Drier Co., Chicago, laundry extractors, ironers, $28,816.

Federal Electric Co. Inc., Chicago, electric horns, $18,532.80.

Gem Mfg. Co., Pittsburgh, steel oil fillers, $5460.

General Machinery Corp., Hamilton, O., rifling machine, for guns, $92,335.

Gleason Works, Rochester, N. Y., bevel gear generator, $6158.57.

Grabler Mfg. Co., Cleveland, iron pipe fittings and plugs, $85,908.67.

Graybar Electric Co. Inc., New York, testing generators, $6150.40.

International Engineering Works Inc., Framingham, Mass., metal lockers, $6044.

International Nickel Co. Inc., New York, nickel-copper alloy, $47,714.50.

Kilby Steel Co., Anniston, Ala., spike and star cutters, $155,415.37.

Laughlin, Thomas, Co., Portland, Me., iron forged boat anchors, $9194.55.

Lear Avia Inc., Dayton, O., inverters for selsyn instruments, $49,500.

Leonard, Ward, Electric Co., Mt. Vernon, N. Y., resistance units, $10,190.

Lewis Engineering Co., Naugatuck, Conn., thermocouples, $5532.

Lidgerwood Mfg. Co., Elizabeth, N. J., boat winches, $91,876.

Lincoln Electric Co., Cleveland, welding electrodes, $438,690.

Lite Mfg. Co., New York, aluminum pole litters, $50,880.

Manning, Maxwell & Moore Inc., Bridgeport, Conn., high pressure valves, $25,-154.60.

Minneapolis-Honeywell Regulator Co., Minneapolis, lateral, aircraft inclinometers, $16,558.50.

Moffitt, Lucian Q., Inc., Akron, O., bear-

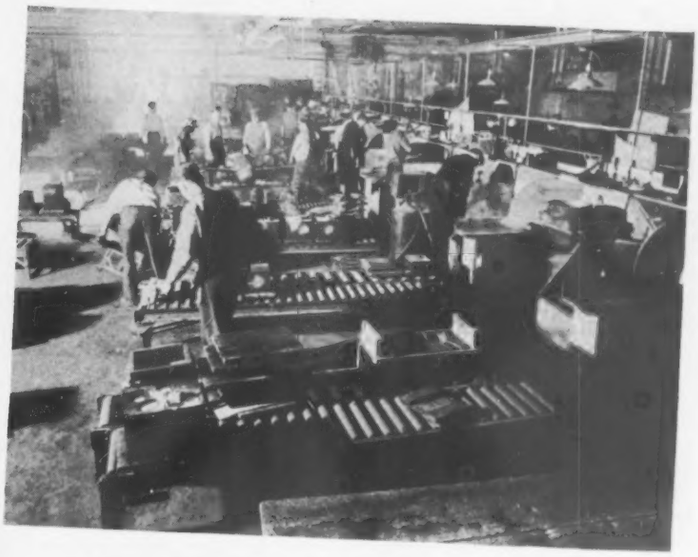
(*Please turn to Page* 128)

When any man adds a single hour to the production life of a tool, or makes that tool do better work, that man makes a worthwhile contribution to American ideals and to America's future.

♦

Long Life for Tools

■ **Distributed by Koebel Diamond Tool Co., 9350 Grinnell avenue, Detroit, this factory poster was designed to encourage careful handling of tools. Poster illustrates suggestion of Charles J. Koebel, president, that tool builders be responsible "for telling the untrained workman how to take care of the tool," STEEL, March 10, p. 38. Poster is 11 x 17 inches and is available from the Koebel company without charge**



■ Magnesium fabricating industry is gaining experience in new uses for the metal, because of intense defense activity. Foundries are piled high with patterns. Floor and bench molders are working three shifts.

*

Above, workmen in American Magnesium Corp.'s Buffalo foundry pouring large sand casting to be used in aircraft

*

Top right, section of bench molding department at Buffalo

*

Right, chipping room in Cleveland plant

Magnesium Now Among Busiest of Metals

■ APPLYING knowledge acquired during peace-time years when there was little demand for its product, American Magnesium Corp., Aluminum Co. of America subsidiary, has stepped up output of magnesium castings to 20 times its 1938 volume. March production will exceed that for the entire year 1938.

Still further expansion will be carried on in four new plant buildings recently purchased from Crane Co. at Bridgeport, Conn.

Total number of employes in American Magnesium's plants in Buffalo, Cleveland, Los Angeles, New Kensington, Pa.; Edgewater, N. J.; and Garwood, N. J.; now is over 2000. With the expansion at Bridgeport and additional output in existing plants, this number will reach nearly 3500 by the middle of 1942. Other manufacturers also are increasing facilities.

Objections raised to the use of magnesium during peace-time years, when a vigorous effort was being made to sell it, were based mainly on fears that the metal would not resist corrosion satisfactorily.

Magnesium is approximately as strong as aluminum for most purposes, and only two-thirds as heavy. However, it has been very difficult to fabricate because it is highly volatile. Molten magnesium, poured into casting molds in the same manner as aluminum or other metals, would burn up. Consequently a special flux must be constantly added to the ladles and furnaces. Even so, the melting losses are many times those encountered with other metals. A synthetic sand, much more expensive than ordinary foundry sand, must be used in making castings.

The technique of manufacturing magnesium fabricated parts has been a difficult one, requiring many years of practice and study. Frequently in producing the more complicated castings, such as are now being called for, a high proportion of rejections is encountered.

The cost situation has steadily improved through the years. As American Magnesium's output has increased, the price charged for the same type of casting per pound has steadily decreased. Corrosion problems have been solved to a considerable extent.

Before the present defense program there were comparatively few army or navy specifications permitting the use of magnesium. Despite the fact that for several years efforts had been made consistently to promote magnesium, the first army specification on magnesium was not issued until 1929 and further specifications were few and far between until recently.

Additional uses for magnesium products have been advocated by the industry for years but have not yet been accepted. Propellers and artillery wheels might be cited as examples. The military services became interested in magnesium propellers a few years back, but just about that time the hollow steel propeller was developed, and the interest in magnesium waned. It is now revived.

January Exports Cut by Licenses; Imports Reach Record Low

■ Iron and steel exports, excluding scrap, in January totaled 653,798 gross tons, valued at $39,691,003, lowest since June, 1940, and 11 per cent smaller in volume than 735,178 tons, valued at $44,259,176, in December, according to the Metals and Minerals division, Department of Commerce. In January, 1940, exports totaled 396,064 tons, valued at $31,153,365.

Following application of the export licensing system to many classes of steel, shipments to all continental areas except Europe were smaller in January than in December. North and Central America and the West Indies received 92,165 tons in January, compared with 108,639 tons in December; South America, 24,907 tons against 66,163 tons; the Far East, 49,123 tons, and 153,225 tons; Africa 25,466 tons, and 33,909 tons. Shipments to Europe in January were 462,137 tons; in December 373,242 tons.

The United Kingdom represented the largest individual market, taking 458,763 tons in January, 362,366 tons in December. The January total included 193,915 tons of non-alloy steel ingots, blooms, etc.; pig iron, 76,834 tons; alloy steel ingots, blooms, 53,033 tons. Canada was second, taking 69,197 tons. Other important markets were Union of South Africa, 17,739 tons, Netherlands Indies, 11,149 tons and Brazil, 11,084 tons.

Exports of scrap metals in January amounted to 45,055 gross tons, valued at $902,535, or 35 per cent less than December shipments of

IRON AND STEEL FOREIGN TRADE STATISTICS

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

(Gross Tons)

Articles	Jan. 1941	Dec. 1940	Jan. 1940
Pig iron	80,322	70,856	15,057
Ferromanganese and spiegeleisen	352	203	408
Ferrochrome	2,691	.....	.....
Other ferroalloys	703	2,646	747
Ingots, blooms, etc.:			
Not containing alloy	201,883	240,095	58,194
Alloy incl. stainless	55,191	17,979	2,608
Steel bars, cold fin.	20,769	12,844	2,761
Bars, iron	120	1,500	1,449
Bars, concrete	7,758	17,692	19,544
Other steel bars:			
Not containing alloy	13,394	28,636	22,577
Stainless steel	49	345	80
Alloy, not stainless	7,147	5,107	1,600
Wire rods	10,855	15,786	9,295
Boiler plate	5,259	896	642
Other plates, not fab.:			
Not containing alloy	43,846	64,517	21,316
Stainless steel	89	144	4
Alloy, not stainless	184	196	173
Skelp iron or steel	11,028	11,134	8,535
Sheets, galv. iron	248	546	984
Sheets, galv. steel	5,820	12,857	16,001
Sheets, "black" steel:			
Not containing alloy	36,266	37,379	30,569
Stainless steel	50	167	241
Alloy, not stainless	535	736	562
Sheets, black iron	1,112	1,848	2,494
Strip steel, cold-rolled:			
Not containing alloy	8,266	6,839	4,792
Stainless steel	59	24	97
Alloy, not stainless	14	49	40
Strip steel, hot-rolled:			
Not containing alloy	9,787	9,095	13,304
Stainless steel	4	5	3
Alloy, not stainless	12	38	35
Tin plate, taggers' tin	9,406	15,292	64,301
Terneplate (incl. long ternes)	698	519	627
Tanks, except lined	3,914	9,273	1,957
Shapes, not fabricated	37,752	40,423	14,529
Shapes, fabricated	4,462	6,160	6,890
Plates, fabricated	3,308	5,364	2,107
Metal lath	86	242	125
Frames and sashes	170	175	164
Sheet piling	461	218	1,971
Rails, 60 lbs.	12,178	19,965	3,952
Rails, under 60 lbs.	3,119	5,592	723
Rails, relaying	383	175	1,154
Rail fastenings	3,333	809	381
Switches, frogs, crsgs.	159	162	381
Railroad spikes	440	576	491
R.R. bolts, nuts, etc.	124	244	369
Boiler tubes, seamless	4,633	2,430	1,539
Boiler tubes, welded	49	170	220
Pipe:			
Seamless casing and oil-line	2,509	10,157	13,641
Do., welded	471	1,776	3,657
Seamless black	1,481	2,404	1,723
Pipe fittings:			
Mall. iron screwed	542	388	498
Cast-iron screwed	77	190	281
Pipe and fittings for:			
Cast-iron pressure	1,890	1,711	1,451
Cast-iron soil	628	792	1,304
Pipe, welded:			
Black steel	2,558	4,135	2,053
Black wrought-iron	744	719	416
Galvanized steel	4,274	5,575	5,539
Galvanized wrought-iron	429	418	728
All other pipe, fittings	6,931	3,147	2,279
Wire:			
Plain iron or steel	3,212	7,125	6,621
Galvanized	2,895	6,476	3,125
Barbed	1,969	5,063	2,418
Woven-wire fencing	166	591	499
Woven-wire sc'n cloth:			
Insect	87	86	39
Other	186	302	143
Wire rope and cable	1,642	1,153	809
Wire strand	132	60	41
Electric welding rods	678	324	283
†Card clothing	.....	1	1
Other wire	1,135	1,278	1,226
Wire nails	1,787	2,347	5,358
Horseshoe nails	141	194	121
Tacks	76	104	73
Other nails, staples	217	610	329
Ordinary bolts, machine screws	3,377	2,901	1,081
Castings:			
Gray-iron (incl. semisteel)	498	766	442
Malleable-iron	366	231	131
Steel, not alloy	160	163	305
Alloy steel, incl. stainless	128	183	200
Car wheels, tires, axles:			
Wheels and tires	960	1,749	771
Axles, no wheels	65	796	181
Axles, with wheels	34	131	7
Horseshoes and calks	23	50	4
Forgings, n.e.s.:			
Not containing alloy	2,102	2,576	2,006
Alloy, incl. stainless	740	558	287
Total	653,798	735,178	396,064
*Scrap, iron and steel:	.....	68,135	185,653
*No. 1 heavy melting	14,621	.....	.....
*No. 2 heavy melting	15,990	.....	.....
*Baled and bundled	3,414	.....	.....
*Cast and burnt	2,429	.....	.....
*Other	7,013	.....	.....
Scrap, tin plate	.....	670	449
Tin plate circles, strips, cobbles, etc.	746	621	326
Waste-waste tin plate	806	503	795
Terneplate clippings and scrap	36	51	234
Total scrap	45,055	69,980	187,457
GRAND TOTAL	698,853	805,158	583,521
Iron ore	192	512	447

*New class. †Not separately classified after December 31, 1940.

U. S. FOREIGN TRADE IN IRON AND STEEL, INCLUDING SCRAP

Gross Tons

	1941 Exports	1941 Imports	1940 Exports	1940 Imports
Jan.	698,853	423	583,521	8,274
Feb.	.....	.....	671,301	6,740
Mar.	.....	.....	663,980	5,096
April	.....	.....	612,906	6,674
May	.....	.....	783,964	7,759
June	.....	.....	936,047	5,505
July	.....	.....	1,034,938	3,542
Aug.	.....	.....	1,402,075	2,105
Sept.	.....	.....	1,221,052	2,598
Oct.	.....	.....	1,105,510	3,966
Nov.	.....	.....	788,176	980
Dec.	.....	.....	805,158	4,064
Tot.	.....	.....	10,608,628	57,303

ORIGIN OF JANUARY IMPORTS

Gross Tons

	Iron ore	Manganese ore
Canada	6,283	.....
Cuba	11,400	3,779
Chile	131,800	.....
Brazil	5,020	13,600
Philippine Is.	.....	4,384
Morocco	.....	38
Netherlands Indies	.....	146
British India	.....	9,724
Soviet Russia	.....	1,857
South Africa	.....	18
Gold Coast	.....	8,046
Total	154,503	41,592

	Sheets, skelp and sawplate	Steel bars
Canada	1	.....
United Kingdom	.....	17
Sweden	.....	2
Total	1	19

UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

(Gross Tons)

Articles	Jan. 1941	Dec. 1940	Jan. 1940
Pig iron	.....	.....	1,914
Sponge iron	23	.....	12
Ferromanganese (1)	.....	2	1,945
Spiegeleisen	.....	3,692	78
Ferrochrome (2)	.....	.....	.....
Ferrosilicon (3)	41	64	269
Other ferroalloys (4)	.....	.....	50
Steel ingots, blooms, etc.	.....	.....	.....
Billets, solid or hollow	.....	.....	204
Concrete reinforce. bars	.....	.....	.....
Hollow bar, drill steel	14	.....	189
Bars, solid or hollow	19	1	400
Iron slabs	.....	.....	.....
Iron bars	.....	.....	85
Wire rods	.....	.....	1,037
Boiler and other plate (including skelp)	1	2	1
Sheets, skelp, saw plate	1	2	8
Die blocks, blanks, etc.	.....	.....	.....
Tin plate, taggers' tin and terne plate	21	22	3
Structural shapes	.....	.....	216
Sashes and frames	19	26	.....
Sheet piling	.....	.....	.....
Rails and track material	.....	5	109
Cast-iron pipe, fittings	.....	.....	.....
Mall. iron pipe fittings	.....	.....	.....
Welded pipe	.....	.....	.....
Other pipe	2	107	412
Cotton ties	.....	.....	.....
Other hoops and bands	.....	5	305
Barbed wire	.....	.....	.....
Round iron, steel wire	3	.....	200
Teleg., telephone wire	.....	.....	.....
Flat wire, steel strips	184	55	230
Wire rope and strand	34	6	81
Other wire	1	.....	.....
Nails, tacks, staples	4	3	38
Bolts, nuts, and rivets	2	1	5
Horse and mule shoes	.....	.....	3
Castings and forgings	37	23	38
Total	406	4,016	7,832
Iron and steel scrap	17	48	442
GRAND TOTAL	423	4,064	8,274

69,980 tons, valued at $1,293,579.

Iron and steel scrap included in this total was 43,467 tons. For the first time the total is broken down into grades, covering No. 1 and No. 2 heavy melting steel, baled and bundled, cast and burnt scrap and miscellaneous. Figures are included in the accompanying table.

The United Kingdom was the chief buyer in January, 38,776 tons, with Canada second, 2888 tons. Mexico took 1376 tons and China, 1346 tons.

Amounting to only 406 gross tons, valued at $157,284, January imports of iron and steel products, other than scrap, set a new low mark. The previous low was 728 tons in November, 1940. Sweden was the chief source in January, with 226 tons, including 184 tons of flat wire; the United Kingdom second, 99 tons, and Canada third, 60 tons.

January scrap imports totaled 17 tons compared with 48 tons in December.

U. S. Steel Corp. Reports Peak February Shipments

■ United States Steel Corp.'s February finished steel shipments were 1,548,451 net tons, a decrease of 134,003 tons, approximately 8 per cent, from 1,682,454 tons shipped in January and an increase of 539,195 tons, 53 per cent, over 1,009,256 tons in February, 1940.

These were the largest February shipments in the history of the corporation. For two months shipments were 3,230,905 tons, against 2,154,848 in the period in 1940.

(Inter-company shipments not included)
Net Tons

	1941	1940	1939	1938
Jan.	1,682,454	1,145,592	870,866	570,264
Feb.	1,548,451	1,009,256	747,427	522,395
March	.....	931,905	845,108	627,047
April	.....	907,904	771,752	550,551
May	.....	1,084,057	795,689	509,811
June	.....	1,209,684	807,562	524,994
July	.....	1,296,887	745,364	484,611
Aug.	.....	1,455,604	885,636	615,521
Sept.	.....	1,392,838	1,086,683	635,645
Oct.	.....	1,572,408	1,345,855	730,312
Nov.	.....	1,425,352	1,406,205	749,328
Dec.	.....	1,544,623	1,443,969	765,868
Total, by Mos.	.....	14,976,110	11,752,116	7,286,347
Adjustment	.....	.....	*44,865	†29,159
Total	.....	.....	11,707,251	7,315,506

†Increase. *Decrease.

■ Representative specimens of the various grades of iron and steel scrap utilized in steel plants and foundries have been assembled and placed on display by Erman-Howell & Co., 332 South Michigan avenue, Chicago. Each grade is identified and bears a key number through which chemical compositions and physical specifications can be ascertained by reference to a catalog.

10.8 Per Cent of January Steel Output Exported

■ Finished steel produced for sale in January totaled 5,163,912 net tons, an increase of 254,464 tons over December output, American Iron and Steel Institute reports.

Exports in January were 558,198 net tons, or 10.8 per cent of total production. In December, exports totaled 713,802 net tons.

Shipments to other members of the industry for further conversion in January were 300,543 net tons against 290,244 tons in December.

Following is a summary of the reports which started on a monthly basis last April, in net tons:

1940	Output	Exported	Pct. Exported
April....	3,005,218	371,532	12.37
May.....	3,576,860	476,761	13.33
June	3,802,485	601,668	15.8
July	4,173,839	835,385	20.0
Aug.	4,649,065	1,053,110	22.6
Sept.	4,446,555	951,555	21.4
Oct.	4,937,388	783,652	15.87
Nov.	4,760,948	562,587	11.82
Dec.....	4,909,448	713,802	14.5
Year	48,584,860	7,683,858	15.8
1941			
Jan.	5,163,912	558,198	10.8

Below is the institute's complete report for January.

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

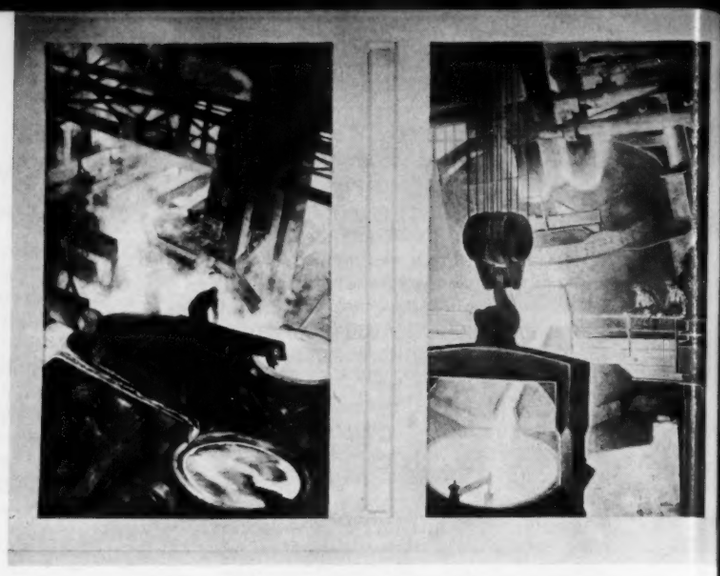
		Number of companies	Items	* Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Per cent of capacity	Shipments: Export	Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	31	1	xxxxxxx	577,451	xxx	220,953	127,415
	Heavy structural shapes	8	2	5,175,800	362,829	82.5	25,755	xxxxxxx
	Steel piling	4	3	360,000	22,053	72.1	1,197	xxxxxxx
	Plates—Sheared and Universal	20	4	6,179,470	433,707	82.6	44,623	2,452
	Skelp	7	5	xxxxxxx	79,155	xxx	7,877	38,642
	Rails—Standard (over 60 lbs.)	4	6	3,613,600	135,950	44.3	12,554	xxxxxxx
	Light (60 lbs. and under)	6	7	302,800	17,633	68.5	6,726	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	102,000	2,457	28.4	158	xxxxxxx
	Splice bar and tie plates	15	9	1,300,200	49,783	45.1	2,950	xxxxxxx
	Bars—Merchant	35	10	xxxxxxx	577,056	xxx	64,109	58,135
	Concrete reinforcing—New billet	15	11	xxxxxxx	108,605	xxx	19,782	xxxxxxx
	Rerolling	17	12	xxxxxxx	9,060	xxx	674	xxxxxxx
	Cold finished—Carbon	18	13	xxxxxxx	93,381	xxx	1,845	xxxxxxx
	Alloy—Hot rolled	15	14	xxxxxxx	128,022	xxx	15,991	11,781
	Cold finished	15	15	xxxxxxx	12,532	xxx	1,496	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	7,040	xxx	133	xxxxxxx
	TOTAL BARS	53	17	12,675,585	935,696	86.9	104,030	69,916
	Tool steel bars (rolled and forged)	15	18	127,870	8,092	74.5	389	xxxxxxx
	Pipe and tube—B. W.	13	19	2,013,200	133,387	78.0	4,183	xxxxxxx
	L. W.	9	20	1,128,260	40,450	42.2	1,422	xxxxxxx
	Electric weld	5	21	692,520	24,597	41.8	312	xxxxxxx
	Seamless	14	22	3,144,190	159,403	59.7	7,840	xxxxxxx
	Conduit	6	23	152,145	11,240	87.0	51	xxxxxxx
	Mechanical Tubing	13	24	513,975	39,501	90.5	3,889	xxxxxxx
	Wire rods	18	25	xxxxxxx	130,283	xxx	16,707	23,122
	Wire—Drawn	36	26	2,299,340	178,949	91.6	12,407	1,948
	Nails and staples	19	27	1,137,090	70,073	72.5	3,786	xxxxxxx
	Barbed and twisted	16	28	448,770	23,403	61.4	3,932	xxxxxxx
	Woven wire fence	15	29	786,790	26,577	39.8	519	xxxxxxx
	Bale ties	11	30	124,450	4,187	39.6	30	xxxxxxx
	All other wire products	5	31	27,030	488	21.3	-	xxxxxxx
	Fence posts	14	32	145,645	6,308	51.0	95	xxxxxxx
	Black plate	11	33	560,455	25,815	54.2	896	1
	Tin plate—Hot rolled	7	34	866,120	20,729	28.2	394	xxxxxxx
	Cold reduced	10	35	2,995,300	183,438	74.0	16,393	xxxxxxx
	Sheets—Hot rolled	24	36	xxxxxxx	624,785	xxx	30,686	14,854
	Galvanized	14	37	xxxxxxx	153,488	xxx	9,926	xxxxxxx
	Cold rolled	16	38	xxxxxxx	272,779	xxx	6,900	xxxxxxx
	All other	14	39	xxxxxxx	85,736	xxx	1,776	xxxxxxx
	TOTAL SHEETS	27	40	13,248,970	1,136,788	101.0	49,288	14,854
	Strip—Hot rolled	24	41	3,522,430	175,612	58.7	6,823	22,193
	Cold rolled	35	42	1,361,560	94,663	81.8	1,051	xxxxxxx
	Wheels (car, rolled steel)	5	43	422,825	19,812	55.2	134	xxxxxxx
	Axles	4	44	472,280	14,717	36.7	8	xxxxxxx
	Track spikes	11	45	327,275	12,635	45.4	314	xxxxxxx
	All other	3	46	9,100	1,051	136.0	12	xxxxxxx
	TOTAL STEEL PRODUCTS	132	47	xxxxxxx	5,163,912	xxx	558,198	300,543
	Pig iron, ferro manganese and spiegel	24	48	xxxxxxx	663,668	xxx	46,327	210,768
	Ingot moulds	4	49	xxxxxxx	58,707	xxx	28	xxxxxxx
Iron Products	Bars	8	50	118,395	4,320	42.9	1	249
	Pipe and tubes	3	51	109,300	5,025	54.1	56	xxxxxxx
	All other	3	52	71,000	2,592	43.0	603	461
	TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	234,195	11,937	60.0	660	710

* To be revised.

Total number of companies included - 150

The estimated yield of products for sale from total ingot capacity of companies included above is 71.2 *%*
of ingot capacity or 57,533,200 *net tons.*
Production for sale, less shipments to members of the industry for further conversion, related to the estimated yield is as follows:
Current month 4,863,369 *N. T.;* 99.5 *%*
Year to date _____ *N. T.;* _____ *%*

How Canton Mobilizes



Resources for Defense Production

■ Early among the communities which moved to survey and co-ordinate their men, machines and materials to further the national defense effort was Canton, O. Instituted by the city's Chamber of Commerce the Canton program has made considerable progress and today may serve, in part, as a pattern for other cities. That other communities may benefit from Canton's experience STEEL sent Mr. Knight to investigate its plan. Canton's industrialists and defense committeemen took him behind the scenes, told him what difficulties had been encountered and overcome, and how they have prepared the community to utilize its resources in manufacturing the materials needed for defense

By HAROLD A. KNIGHT
Associate Editor, STEEL

CANTON, O.

■ HERE is a community which, when the history of America's preparations for defense is written, should appear in the first chapters. Canton started mobilizing for defense early, about Nov. 1, 1940, whereas it was not until Dec. 5 that chambers of commerce and other civic bodies first received the call from Morris L. Cooke, managing engineer for the National Defense Advisory Commission, for a survey of defense facilities.

It has been easy enough for the government to contact prime contractors. Main problem has been to locate and organize potential subcontractors. That is where chambers of commerce, mayors, manufacturing associations and civic bodies function.

On Jan. 16, 1941, the Canton Chamber of Commerce sent questionnaires to 150 plants in that city of 120,000 population. Two weeks later it had received replies from 80 per cent, listing products made, equipment, total number of factory employes, number of skilled workers by classifications, number of hours per week that equipment was in use, and list of idle machinery.

The ink on the signature of one of the replies had scarcely dried before chamber of commerce officials realized an important contribution had been made.

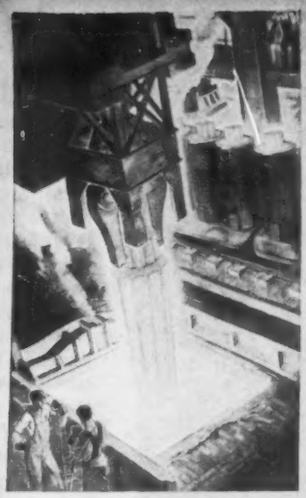
The White Motor Co., Cleveland, has been making armored motor trucks for the army. At one stage of their manufacture the trucks are brought here under their own power for armor plating at the Diebold Safe & Lock Co., a trip of about 60 miles. Heretofore canvas tops had been furnished by an awning manufacturer at Buffalo, an arrangement which was unsatisfactory, partly because of the distance. Questionnaires revealed the Hoover Co., North Canton, could make these tops. Not only is the Hoover company a large and well established manufacturing concern, the largest vacuum cleaner manufacturer in the world, but it is much nearer the truckmaker.

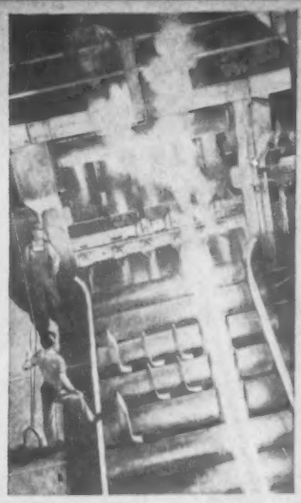
Now Canton is favorably situated for doing a good job at defense. It is near the manufacturing center of industrial United States. Its industries are largely metalworking. Some half dozen manufacturing plants are the largest of their kind in the country, perhaps the world. More electric steel is made here, for instance, than any other place, and that is an interesting story in itself. History is that Henry Ford, after attending an automobile race at Indianapolis was impressed by a certain foreign car. Many of its parts were made of new alloy steel. Ford tried to induce manufacturers in the United States to attempt alloy steel manufacture. He finally induced a Canton company to attempt it. Hence today's supremacy in electric furnace steel.

Canton has forged ahead of industrial Ohio generally in increasing its employment, industrial earnings, retail sales and other indexes which are used as barometers. Canton believes it has the best vocational high school in the United States, a building which is the dream of all educators and communities. School was made possible by a $1,250,000 gift by the late H. H. Timken.

The spark plug of community effort is the Chamber of Commerce, whose president is B. E. Froehde, of the General Insurance Agency, and whose manager is Dallas L. Hostetler. The chamber never sleeps. Office hours are 8:30 to 6, but meetings and conferences know no established hours.

The chamber was hitting on all cylinders long before the call for defense mobilization. Especially helpful as a drill for defense harmony have been the weekly Saturday noon "luncheon forums" which





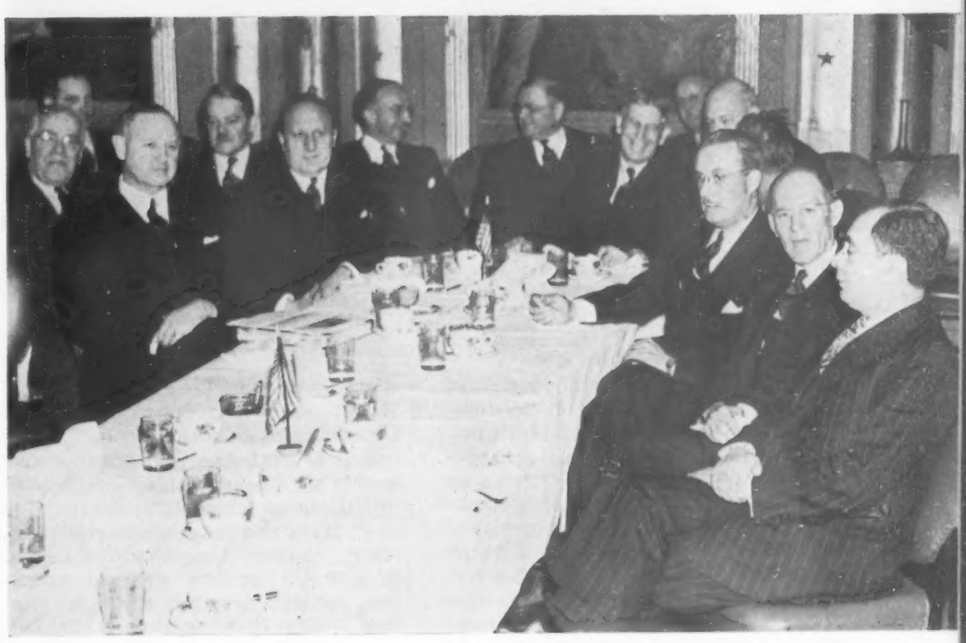
threshed out many problems, such as taxation, legislation, labor relations.

Canton does not claim to be the first community to have organized for defense. It obtained many good ideas from a similar movement at York, Pa., described in STEEL, Feb. 17, page 44. But Canton certainly has been among the first half dozen to launch and push forward a vigorous campaign that is bearing results already. Even the men of Canton have their doubts, problems and discouragements at times. At a luncheon meeting in Hotel Onesto, which STEEL's representative had the privilege of attending, John Quinn, manager, United Engineering & Foundry Co., and chairman of the Canton national defense committee, stated: "We can't forever make plans; the time has come when we've got to do something."

In Canton, as in the country generally, the problem of the subcontractor is the "No. 1." First, to find out who the potential subcontractors are; second, what they can make; third, what machinery and equipment they possess; fourth, what is their labor supply and how skilled; fifth, how they can work with prime contractors. In this Canton has made good progress. Not only have they put subcontractors into motion but in a few cases what they call sub-subcontractors and in one case a sub-sub-subcontractor, as they whimsically describe him.

For instance the Canton Drop Forging & Mfg. Co. supplies parts to the Hercules Motor Corp. Hercules, in turn produces motors for the White Motor Co., Cleveland.

The recent questionnaires revealed some interesting facts. Unusual was the case of C. Brownlow Miller Inc., which, though employing only five workmen, had 55 machines, the machinery being engaged 52 hours a week. Effinger & Hoffman wrote that their machines were employed nine hours a day and were willing, provided they receive subcontracts, to work them 24 hours per day in three shifts. The Louisville Machine Mfg. Co., Louisville, O., wrote they have 24 machines which they wish to put to work 24 hours a day.



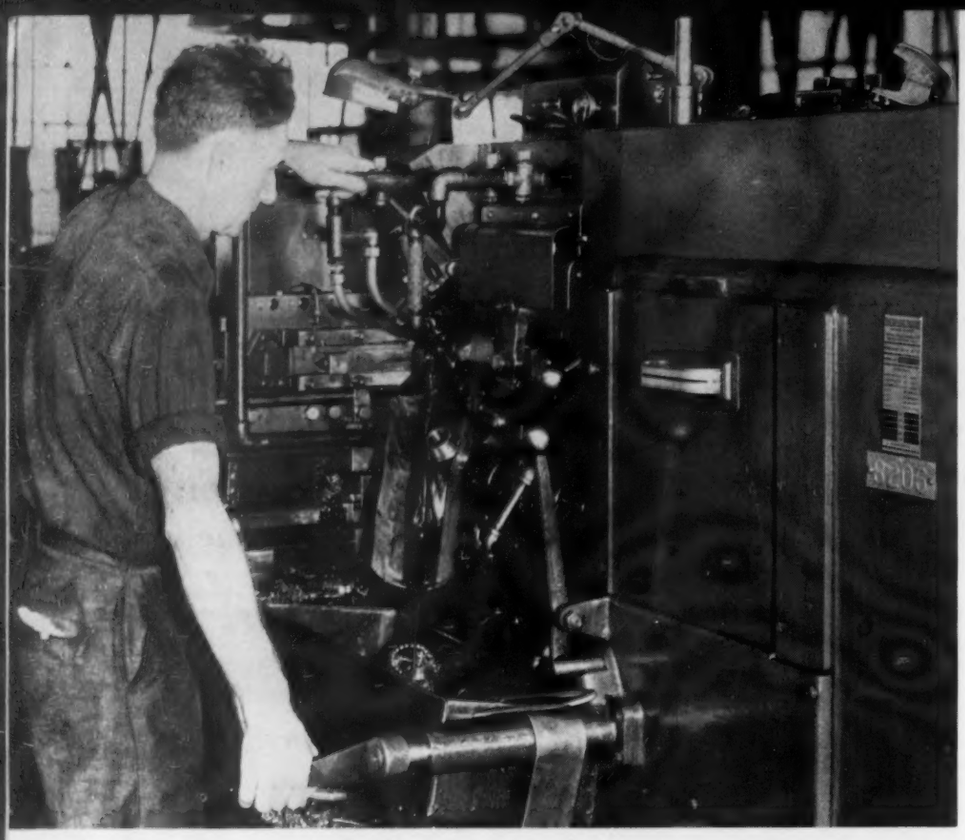
■ **Defense committee of the Canton Chamber of Commerce includes some of the community's leading industrialists, shown discussing plans at a luncheon meeting. Canton is so proud of its steel industry that its new postoffice murals, at top of page, depict various steel mill scenes. Latter photo, courtesy Treasury Department Art Projects**

Wages for skilled labor at Canton are claimed to be the second highest in the country, second only to Detroit. Naturally these wages attract much labor to Canton, but even Canton has its labor supply problems, which are being aggravated by a new plant being constructed for the manufacture of naval ordnance, to be supervised and operated by Westinghouse Electric & Mfg. Co., and which will require 2000 workmen. According to a preliminary statement of labor needs for that plant 100 all-around mechanics will be required with the rest trained for one operation only. The 150 questionnaires, of course, revealed the supply of labor by plants and in the open records of the chamber of commerce these plants are assigned numbers rather than names so that too much will not be revealed to competitors.

Speaking of a common industrial problem at times like this wherein one manufacturer hires away skilled workmen from another, STEEL's representative asked Mr. Quinn: "How will you safeguard against such competitive bidding for labor here?"

"We have learned our lessons from other years," answered Mr. Quinn. "There will be no such hiring away from other plants now, except in a few instances where the workman himself will be benefited by obtaining a promotion, where he may get experience on a more complicated machine. We have the individual's good at heart."

Canton is counting heavily on training a new supply of workmen



■ Typical automatic screw machine setup for turning out tapered roller bearing cones at a rate of 90 an hour. Automatics are among the most highly developed and efficient high-production machine tools. Timken Roller Bearing Co. photo

and is admirably fitted through the vocational schools, the Timken vocational high school and the McKinley high school. Moreover, arrangements will be made to train men at the plants at moments when tools and machinery are idle. The board of education will probably furnish materials and some instruction.

The Timken school contains machine tools and equipment which are the envy of other communities and manufacturers. At Timken school are given what are called "refresher courses," for machinists who have suffered periods of idleness and wish to get hands in again, or desire to learn new operations. On several days the Timken school is open for instruction and practice 24 hours a day, a large share of the students being adults.

Besides there are at least 100 high school students learning the various arts and shop practices. They say graduate welders usually step into $20 per week jobs immediately after leaving school. Directing the vocational education is G. F. Malick. This school is the pet of Jesse H. Mason, superintendent of schools, who says that the usual horseplay among the boys of the ordinary high school is entirely lacking at Timken. There is no boredom, but genuine, healthy interest and industry in the 25 vocational courses.

Early in its defense activity the Chamber of Commerce appointed a committee of 14, headed by Mr. Quinn, as previously noted. Other members are: L. S. Hamaker, general manager, Berger Mfg. Co.; H. C. Weible, secretary-treasurer, Diebold Safe & Lock Co.; B. T. Bonnot, president, the Bonnot Co. (and author of a defense plan which was published in STEEL, Jan. 20, p. 47); J. F. Hattersley, assistant vice president, Hoover Co., North Canton; Walter C. Sanders, general manager, railway bearings division, Timken Roller Bearing Co.; H. D. Dilmore, president and treasurer, Canton Metal Decorating Co.; Darwin S. Luntz, president, Luntz Iron & Steel Co.; Charles L. Bowman, president, Bowdil Co.; W. R. Harrison, general manager, Spun Steel Corp.; W. A. Porterfield, vice president, Union Metal Mfg. Co.; John Buchman Jr., secretary-treasurer, Frankham Brass & Bronze Co.; G. F. Malick, vocational director of Timken vocational high school; and Roger B. Kelley, executive vice president, Canton Development Corp.

Out of this committee has been chosen a subcommittee of industrial engineers to actually facilitate the placing of defense orders, the original committee being too large for efficient functioning.

A. B. Clay, North Canton, who has had extensive experience in production engineering, machine shop practice and plant equipment, has been employed as a full-time inspector of production facilities.

The Cleveland ordnance office has been invited to establish a Canton branch, rent free, at chamber headquarters, for mutual advantage.

Members of the Chamber of Commerce have expressed amazement at the lack of information in Washington as to defense facilities. It had been supposed that under the national defense act of 1921 by which it was provided that a thorough survey of men, material and factory facilities would be compiled for "M-Day" Washington knew all the answers. But the Canton chamber has had to start from scratch. There has been a certain indifference on the part of prime contractors to give information as regards how they could farm out work to subcontractors. Apparently the prime contractors have been too busy with their own problems to compile and disseminate such information.

On Feb. 5, however, the Canton chamber announced that information concerning all national defense contracts and awards exceeding $100,000 in value is now available at the chamber offices, this having been received from the semimonthly compilation of the Office of Government Reports. Included in the information is the name and address of the manufacturer or contractor, items covered in the award and the amount of the contract.

A complete list of contracts and awards, containing many under $100,000 is available, the chamber states, through the state offices of that government agency, the address of the Ohio office being 1405-06 Central National Bank building, Cleveland.

Chamber Disseminates Information

The chamber frequently issues bulletins with last minute information of interest to those whom it might concern. Typical is the following item: "A New York manufacturer, in an inquiry to our office, is looking for a concern which can produce brass castings and stampings, such as are used on cartridge belts, suspender belts, canvas bags and canvas and leather straps."

The subcontractors have much the same risks under defense manufacture as in ordinary times. One of the important risks of the subcontractor, or the prime contractor for that matter, is that his work will be rejected on the claim that it does not meet government specifications or standards.

No standardized method of payment to subcontractors has been evolved as yet, there being no set procedure as to whether certain sums are to be paid with placing of orders, so much on delivery, or so much 30 to 60 days later. Each agreement of payment between prime and subcontractor is subject to special negotiation as in normal times.

It was the opinion at Canton that the prime contractor often has more to worry about as to performance of subcontractors than vice versa, be-

cause the "sub" sometimes is a smaller, less sound concern. The incident was told where a Cleveland prime contractor had placed a subcontract many miles East. The work did not come through on schedule and on the frequent trips of a Cleveland representative to the subcontractor a loan was invariably asked for, the implication being that lack of funds was delaying the work.

Of course, as the $23,000,000,000 appropriated originally by the United States government for defense is distributed throughout the country the financing abilities of both prime and subcontractors will improve. Besides, there is elaborate machinery set up at the Federal Reserve banks for arranging loans, as outlined in STEEL on Feb. 3, page 43.

Canton's diversity of manufacture is shown in the manufacture of one item alone, the armored army motor trucks, made by the White Motor Co., Cleveland. Contributing to such manufacture are at least four Canton concerns: Canton Drop Forging & Mfg. Co., Timken Roller Bearing Co., Hercules Motor Co., Diebold Safe & Lock Co., with the Hoover Co. soon to make canvas tops, thus making five.

Having scrutinized thoroughly the manufacturing plants within the city limits the Canton chamber is now surveying prime contractors within a radius of 100 miles of the city, in line with Washington's requests.

A member of the chamber offered a mild criticism of the Federal Reserve bank of Cleveland, suggesting that they confine themselves to matters of advancing loans to prime and subcontractors and not dabble in serving as clearing house in materials, machines and labor. Perhaps this man did not realize not all communities in the Cleveland federal reserve district are so well organized as Canton; hence the Cleveland bank's efforts in many communities are advisable and welcomed. Besides, some centralized clearing house is patently necessary.

Publicity Aids Preparations

"Out of all the chaos and confusion we should learn something for the next national emergency in the years to come," suggested a member. "But on second thought I don't know. Experiences in the World war do not seem to have helped us much on this occasion," he concluded ruefully. After all, it is recalled, some 2,000,000 American soldiers fought largely with French and British guns and ammunition.

Canton has prepared for defense broadly. Committees have been appointed to survey housing facilities for the increased labor forces, housing which has proved adequate; for water supply, which may prove inadequate unless present supply is augmented.

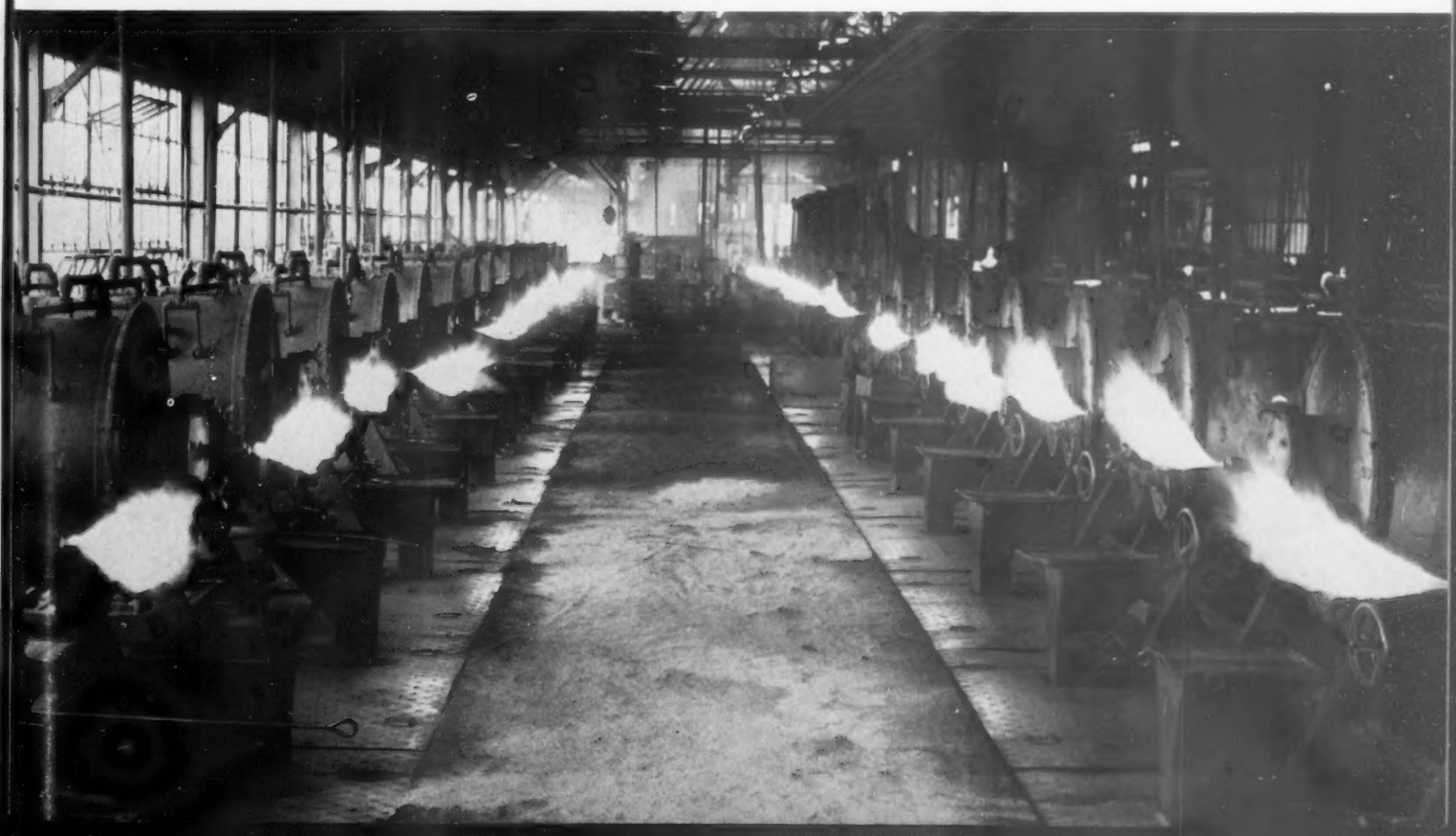
Just as York, Pa., passed on to Canton its experiences in organizing for defense, so will Canton undoubtedly pass along its experiences, as is the purpose of this article. Let it be said to other chambers that publicity is an important phase of the work. The manager of the Canton chamber, Mr. Hostetler, is a former newspaper man. Every step is made known to the local newspapers, representatives of which are also welcome to all meetings. Both reporters and photographers are in constant attendance and the *Canton Repository* devotes many columns to defense work. Publicity keeps the citizens informed and interested. It keeps defense bodies in other centers posted.

The principal new plant being constructed at Canton under the defense program is the $16,000,000 naval ordnance plant for manufacture of precision gun mountings. This will be bomb and shatterproof, air-conditioned and designed for blackout. Building will be windowless, with complete artificial illumination. It is expected to be in operation by September.

Potential workers for the plant are to be trained in Timken vocational high school and in several Canton plants over periods of three to six months, according to the Ohio State Employment Service. Classes are under way. Men between ages of 21 and 35, with a high school education, or equivalent, are being given preference. All trainees must pass mechanical aptitude tests and physical examinations.

As we sat in on the Feb. 4 luncheon meeting of the chamber we could not help but wish that a certain "herr," a certain "signor" and the sword rattling slant-eyed gentlemen from the Far East had been there. They would have thought twice before taking any pot shot at anything American.

■ **Battery of rotary carburizing furnaces used in heat-treating bearing parts to produce hard, wear-proof surfaces with tough inner cores. Plumes of fire consume exhaust gases. Timken Roller Bearing Co. photo**



The Die Is Cast! Now To Beat Our Own Production Schedule!

■ Enactment of the lease-lend-give legislation is the signal for full-speed ahead on defense.

It is sweeping aside the last lingering traces of indecision and uncertainty as to this nation's role in world affairs. We have assumed the task of aiding Britain to the limit. Our commitment is as clear-cut as if we had formally declared war.

• • •

This means that we are enlisted in a race against time. Can we furnish war materials and goods in sufficient volume and in time to enable Britain, Greece and other free nations to hold out against the might of the axis powers until the ultimate superiority of the resources of the democratic states results in victory?

In large measure, the answer to this question rests upon the resourcefulness and ingenuity of American industry.

Thus far, in organizing for defense, we have banked heavily upon our national reputation for prowess in mass production. OPM has planned on a grand scale. It has concentrated much of its attention upon large contracts and upon gigantic production units. Some of these are yielding effective output now, but many of the large plants now under construction will not be producing in satisfactory volume before 1942.

• • •

In short, the timetable of American industry provides for moderate production up to the middle of this year, a gradual to sharp rise during the last half, and a tremendous volume of output starting sometime next year.

If production under this timetable will serve the requirements of the free nations at war, all will be well. But if events in the theaters of war make it necessary to deliver goods to the fighting zones earlier than is contemplated under our timetable, then American industry would be in an embarrassing position. It would be forced to revise its schedule.

The possibility that our industrial timetable will not jibe with the timetable of war is so strong that this nation cannot afford to take chances.

We must find ways of getting effective production out of existing plants and equipment to fulfill requirements until the great 15- and 20-million-dollar plants can swing into action.

• • •

The only way is to distribute defense work more widely throughout industry. That is why industry's representatives in Washington are placing renewed emphasis upon farming out and subcontracting. It explains the zeal of army ordnance officers in urging that every productive machine in the country be assigned a piece of war work.

This challenge to put every available unit of capacity to work will arouse the Yankee spirit of determination to win against heavy odds.

Industry's immediate task is to do anything and everything that will put war output ahead of the present timetable.

E. L. Shaner

EDITOR-IN-CHIEF

The *BUSINESS TREND*

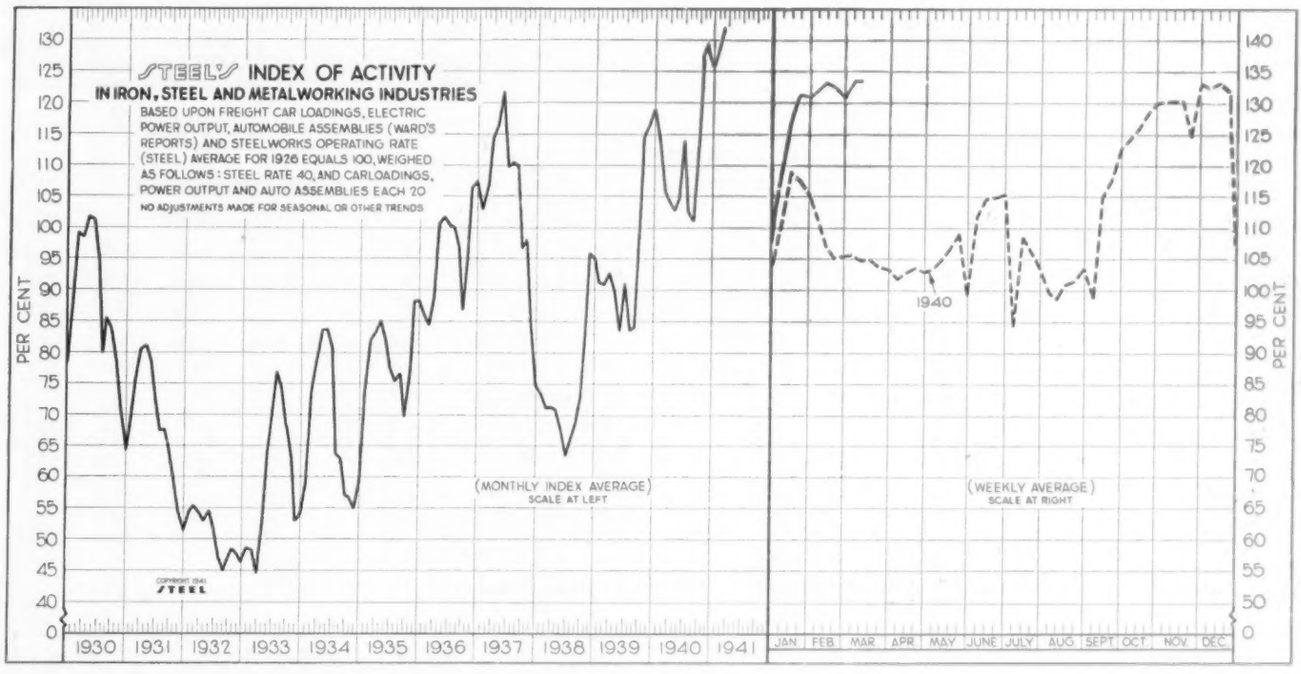
Industrial Activity Well Sustained at Peak Level

■ PACE of industrial activity is well sustained at the present peak level, particularly in those industries directly related to the defense program. New orders continue to bolster the current level of operations and in some instances still exceed output.

Little headway has been made against the huge order backlogs accumulated in the defense industries over the past few months. As new production units are brought into service the already exceptionally extended delivery dates on some products should be shortened.

STEEL's index of activity gained 0.1 point to 133.1 during the week of March 8. In the comparable period last year the index declined 0.9 point to 104.7. For the same week of 1939, 1938 and 1937 the index stood at 92.7, 70.8 and 112.7 respectively.

During the latest period steelmaking operations reached a new high on an actual tonnage basis. Electric power output advanced to 2,835,321,000 kilowatts in the week ended March 8, while slight declines were recorded in automobile assemblies and freight carloadings. The general high level of the automobile production and freight traffic has held up exceptionally well for this season of the year.


STEEL INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100, WEIGHED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
(MONTHLY INDEX AVERAGE) SCALE AT LEFT
(WEEKLY AVERAGE) SCALE AT RIGHT
1940
1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

STEEL'S index of activity gained 0.1 *point to* 133.1 *in the week ended March* 8:

Week Ended	1941	1940
Jan. 4	114.5	110.3
Jan. 11	128.2	119.2
Jan. 18	130.8	117.3
Jan. 25	130.7	115.4
Feb. 1	132.0	111.6
Feb. 8	132.7	107.2
Feb. 15	132.3	105.1
Feb. 22	131.2	105.4
March 1	133.0	105.6
March 8	133.1	104.7

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March		104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April		102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May		104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June		114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July		102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.		101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.		113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.		127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.		129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.		126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3

Steel Ingot Operations

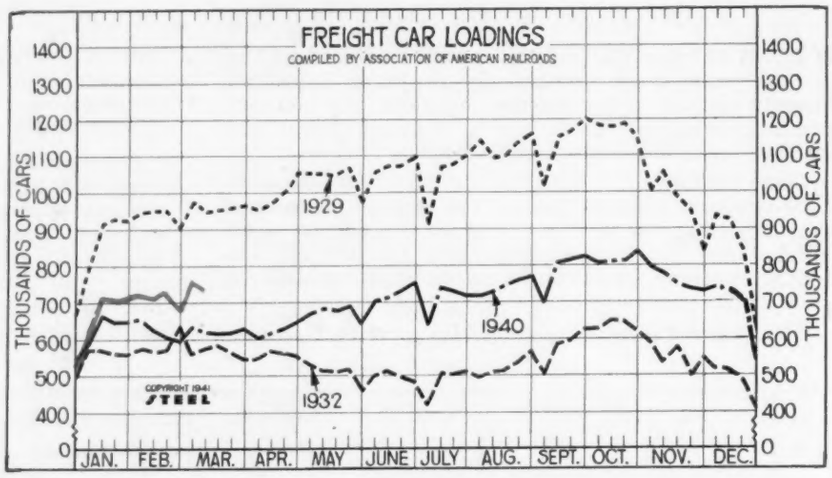
(Per Cent)

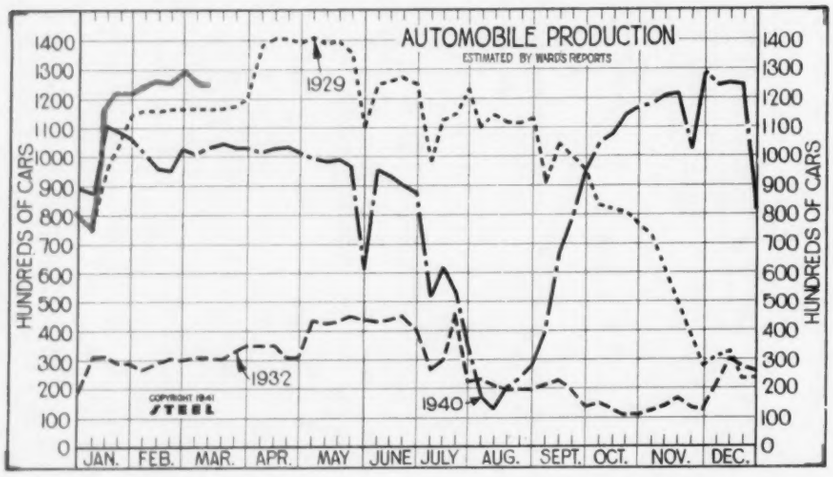
Week ended	1940	1939	1938	1937
Nov. 23....	97.0	93.5	62.0	31.5
Nov. 30....	97.0	94.0	61.0	30.5
Dec. 7....	96.5	94.0	61.0	27.0
Dec. 14....	95.5	92.5	58.0	27.0
Dec. 21....	95.0	90.5	52.0	23.0
Dec. 28....	80.0	75.5	40.0	21.0
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4....	92.5	86.5	51.5	26.0
Jan. 11....	93.0	86.0	52.0	29.0
Jan. 18....	94.5	84.5	51.5	30.5
Jan. 25....	95.5	81.5	51.5	33.0
Feb. 1....	97.0	76.5	53.0	31.0
Feb. 8....	97.0	71.0	54.0	30.0
Feb. 15....	96.5	69.0	55.0	31.0
Feb. 22....	94.5	67.0	55.0	30.5
March 1...	96.5	65.5	56.0	29.5
March 8...	97.5	63.5	56.5	30.0

Freight Car Loadings

(1000 Cars)

Week ended	1940	1939	1938	1937
Nov. 30.....	729	689	649	623
Dec. 7.....	739	687	619	622
Dec. 14.....	736	681	606	603
Dec. 21.....	700	655	574	460
Dec. 28.....	545	550	500	457
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4.....	614	592	531	552
Jan. 11.....	712	668	587	581
Jan. 18.....	703	646	590	570
Jan. 25.....	711	649	594	553
Feb. 1.....	714	657	577	565
Feb. 8.....	710	627	580	543
Feb. 15.....	721	608	580	536
Feb. 22.....	678	595	561	512
March 1.....	757	634	599	553
March 8.....	742	620	592	557





Auto Production

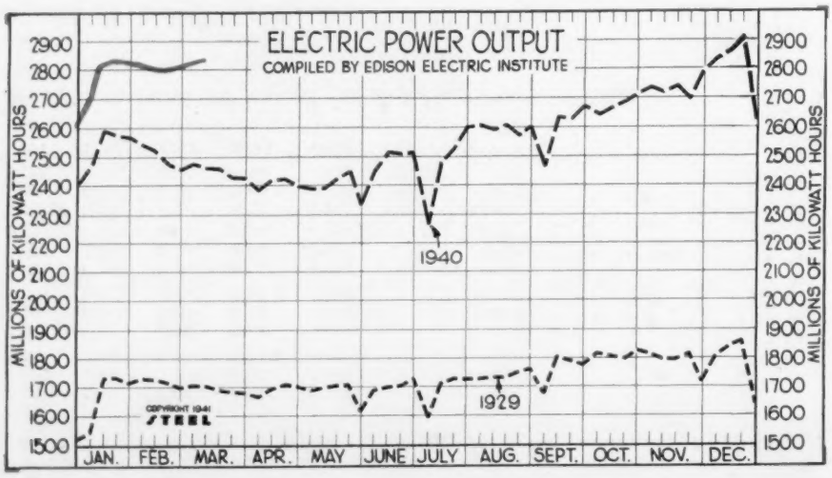
(1000 Units)

Week ended	1940	1939	1938	1937
Dec. 14....	125.6	118.4	102.9	82.0
Dec. 21....	125.3	117.7	92.9	67.2
Dec. 28....	81.3	89.4	75.2	49.6
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4....	76.7	87.5	76.7	54.1
Jan. 11....	115.9	111.3	86.9	65.7
Jan. 18....	124.0	108.5	90.2	65.4
Jan. 25....	121.9	106.4	89.2	59.4
Feb. 1....	124.4	101.2	79.4	51.4
Feb. 8....	127.7	96.0	84.5	57.8
Feb. 15....	127.5	95.1	79.9	59.1
Feb. 22....	129.2	102.7	75.7	57.0
March 1..	126.6	100.9	78.7	54.4
March 2...	125.9	103.6	84.1	57.4

Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
Nov. 30...	2,796	2,539	2,285	2,153
Dec. 7...	2,838	2,586	2,319	2,196
Dec. 14...	2,862	2,605	2,333	2,202
Dec. 21...	2,911	2,641	2,363	2,085
Dec. 28...	2,623	2,404	2,121	1,998
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4...	2,705	2,473	2,169	2,140
Jan. 11...	2,835	2,593	2,270	2,115
Jan. 18...	2,844	2,572	2,290	2,109
Jan. 25...	2,830	2,566	2,293	2,099
Feb. 1...	2,830	2,541	2,287	2,082
Feb. 8...	2,824	2,523	2,268	2,052
Feb. 15...	2,810	2,476	2,249	2,059
Feb. 22...	2,820	2,455	2,226	2,031
March 1..	2,826	2,479	2,244	2,036
March 8..	2,835	2,464	2,238	2,015

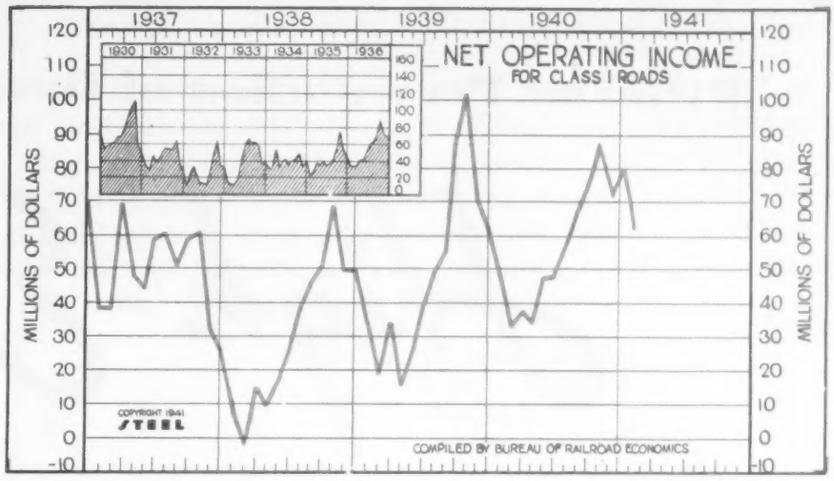

ELECTRIC POWER OUTPUT
COMPILED BY EDISON ELECTRIC INSTITUTE
MILLIONS OF KILOWATT HOURS
1940
1929
COPYRIGHT 1941 STEEL
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

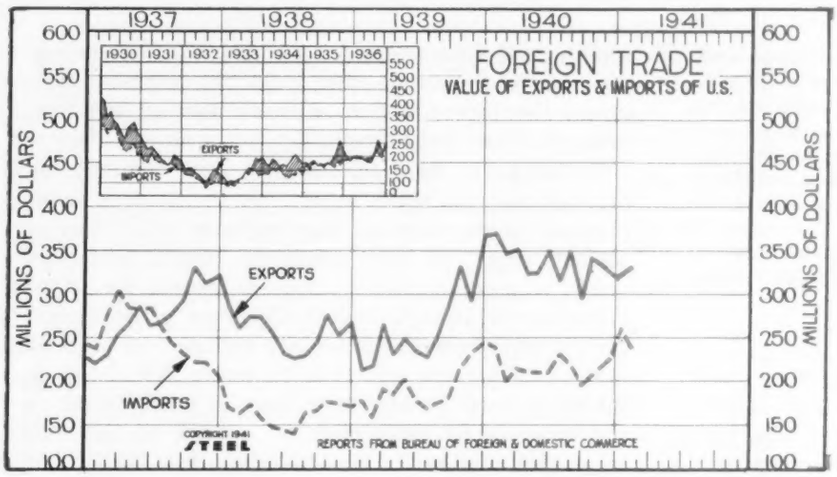
Class I Railroads
Net Operating Income

(Unit: $1,000,000)

	1941	1940	1939	1938
Jan.	$62.36	$45.57	$32.89	$7.14
Feb.	.....	32.62	18.59	1.91*
Mar.	.....	36.73	34.32	14.73
April	.....	33.82	15.32	9.40
May	.....	47.08	25.10	16.67
June	.....	47.42	39.10	25.16
July	.....	57.08	49.01	38.43
Aug.	.....	66.01	54.59	45.42
Sept.	.....	74.19	86.43	50.36
Oct.	.....	86.99	101.62	68.57
Nov.	.....	71.10	70.35	49.67
Dec.	.....	78.79	60.95	49.37
Average	.....	$56.84	$49.02	$31.02

*Indicates deficit.





United States
Foreign Trade

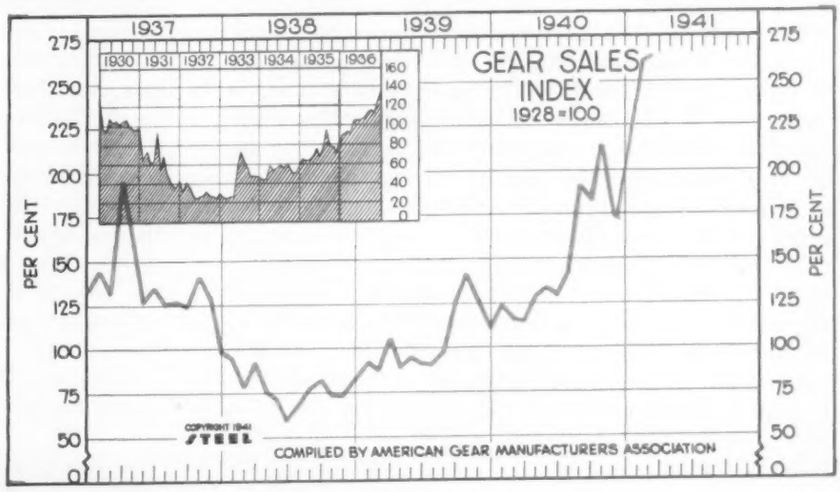
(Unit: $1,000,000)

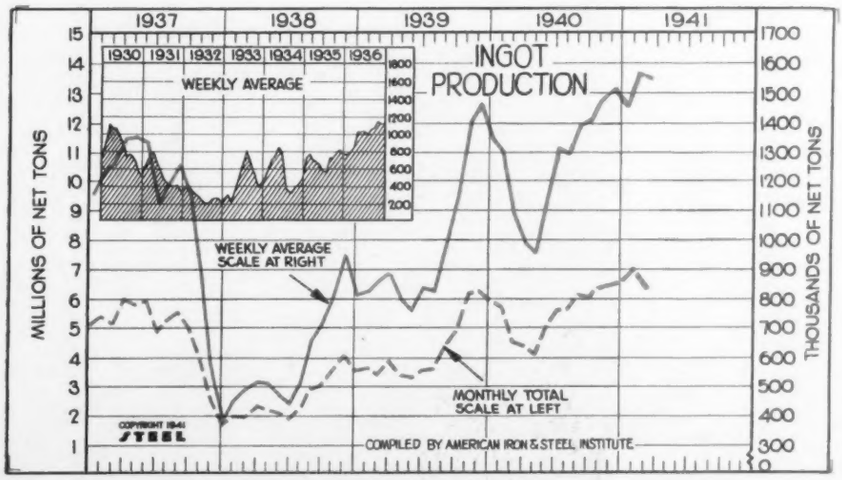
	Exports		Imports	
	1941	1940	1941	1940
Jan.	$325.4	$368.6	$228.6	$241.9
Feb.	.....	347.0	.....	199.8
Mar.	.....	352.3	.....	216.7
April	.....	324.0	.....	212.2
May	.....	325.3	.....	211.4
June	.....	350.2	.....	211.4
July	.....	317.0	.....	232.3
Aug.	.....	349.9	.....	220.5
Sept.	.....	295.2	.....	194.9
Oct.	.....	343.5	.....	207.1
Nov.	.....	327.7	.....	223.4
Dec.	.....	322.3	.....	253.1
Total	.....	$4,021.6	.....	$2,625.4

Gear Sales Index

(1928 = 100)

	1941	1940	1939	1938	1937
Jan.	259	123	91.0	93.0	144.0
Feb.	262	116	86.0	77.0	130.5
Mar.	...	114	104.0	91.0	195.0
April	...	128	88.0	74.0	164.0
May	...	133	93.0	70.0	125.5
June	...	129	90.0	58.0	134.0
July	...	141	89.0	67.0	124.0
Aug.	...	191	96.0	76.5	125.0
Sept.	...	183	126.0	80.5	123.0
Oct.	...	216	141.0	72.5	139.5
Nov.	...	173	126.0	72.0	127.5
Dec.	...	208	111.0	81.0	97.0
Ave.	...	155.0	103.0	76.0	135.5





Steel Ingot Production

(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1941	1939	1941	1940
Jan.	6,943.1	5,768.7	1,567.3	1,302.2
Feb.	6,250.4	4,527.1	1,562.6	1,093.5
Mar.	.....	4,390.1	.....	991.0
Apr.	.....	4,100.7	.....	955.9
May	.....	4,967.0	.....	1,121.2
June	.....	5,659.7	.....	1,319.3
July	.....	5,727.5	.....	1,295.8
Aug.	.....	6,187.3	.....	1,396.7
Sept.	.....	6,051.9	.....	1,415.2
Oct.	.....	6,644.0	.....	1,499.8
Nov.	.....	6,470.2	.....	1,508.2
Dec.	.....	6,493.8	.....	1,469.2
Total	.....	66,993.2	.....	1,281.4†

†Weekly average.

Pictorial Presentation of Operations on

High-Explosive

From Forging

■ **Starting Jan. 27, 1941, this series of weekly articles on shell production has covered: One, a background on shell; two, types of shell and their metallurgy; three, parting off the billets and heating for forging; four, forging problems and the Witter cross roll; five, trends in shell forging, the Baldwin-Omes and upsetter forging machines; six, considerations in machining shell; seven, "emergency" lathes designed by National Machine Tool Builders' Association.**

Next week, section nine will present a detailed study of the multiple spindle automatic lathe for high-production work on shell.

■ CONSIDERABLE attention has already been given to the important features of the machine tools—lathes for turning—in the sequence of operations necessary to convert a shell forging into a finished component ready for filling at the powder plant, while those other essential units in the line such as the nosing press, the band press and the spot welder have apparently been neglected. The reason, of course, is that there is very little argument concerning their essential features. It may, however, be of some interest to present at this juncture, the complete layout of at least one manufacturer, all necessary machines being specified and illustrated.

Not all shell makers are, of course, in agreement as to the precise number of operations required, nor perhaps as to the exact order in which these should be performed on shell of any given caliber. So this production analysis is not intended as a pattern but is merely offered here by way of illustration. The firm selected is S. A. Woods Machine Co. of Boston, whose president, H. C. Dodge, has kindly furnished the following information and illustrations, supplemented by material from W. C. Lipe Inc., of Syracuse, N. Y.

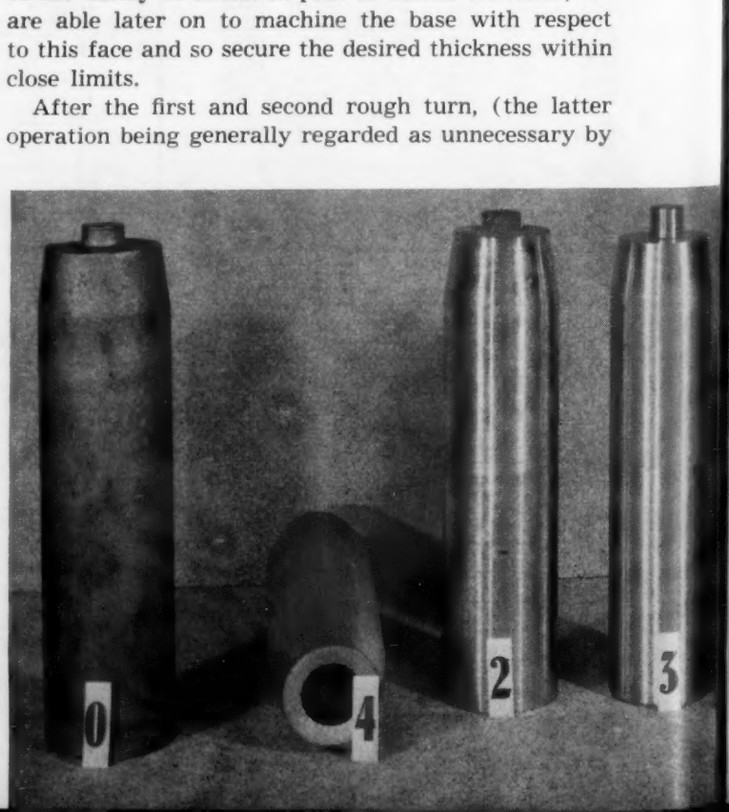
Views on pages 56, 57 show what shell body looks like after successive operations. The numbers correspond to sequence of operations noted in Table 1.

Illustration on page 58 shows the layout developed by S. A. Woods Machine Co. in association with W. C. Lipe Inc. to handle an educational order and capable, of course, of expansion to meet subsequent needs. On the right of this figure we see in succession, shell-banding, drilling and tapping for the set screw, notching the nose and, standing up above the general level, a Bliss nosing press. On the extreme left, stands the thread miller; then further up the line, base-grind and body-turning.

No elaborate conveyor systems were installed for this purpose, the shells being transported from point to point on two-wheeled buggies fitted with rows of wooden pegs. In high production work, conveyors would be used, of course. Typical layouts for either a circular or straight-line arrangement of equipment for conveyorized production are included on page 63.

Since it became practical to finish the cavity in the forge shop, greater care must be taken to secure concentricity by machining the outside of the shell in correct relation to the interior, since there is no opportunity to correct the situation later. The plan followed is to use a heavy mandrel with spring-loaded expanding dogs ahead and wedge-operated dogs in rear, together with a positioning plunger which bears on the bottom of the cavity. In this first operation, the open end of the shell is faced to length with respect to the bottom of the cavity and the base is centered with a ½-inch drill and a 0.218-inch pilot. By facing the open end with respect to the bottom of the cavity to limits of plus or minus 0.01-inch, we are able later on to machine the base with respect to this face and so secure the desired thickness within close limits.

After the first and second rough turn, (the latter operation being generally regarded as unnecessary by



Successive stages in machining a shell. Left, view shows results of operations 1 to 5; right, operations 6 to 18. Operations refer to numbers, Table 1

Shell Shop to Loading Plant

Here is presented a detailed step-by-step pictorial description of latest shell finishiing methods employed by S. A. Woods Machine Co., Boston, from receipt of the forged blank to packing for shipment to the shell-loading factory where the charge is inserted. Included are details of stages of machining; cost studies of machines, tooling and accessories for machining, welding, finishing and other individual operations

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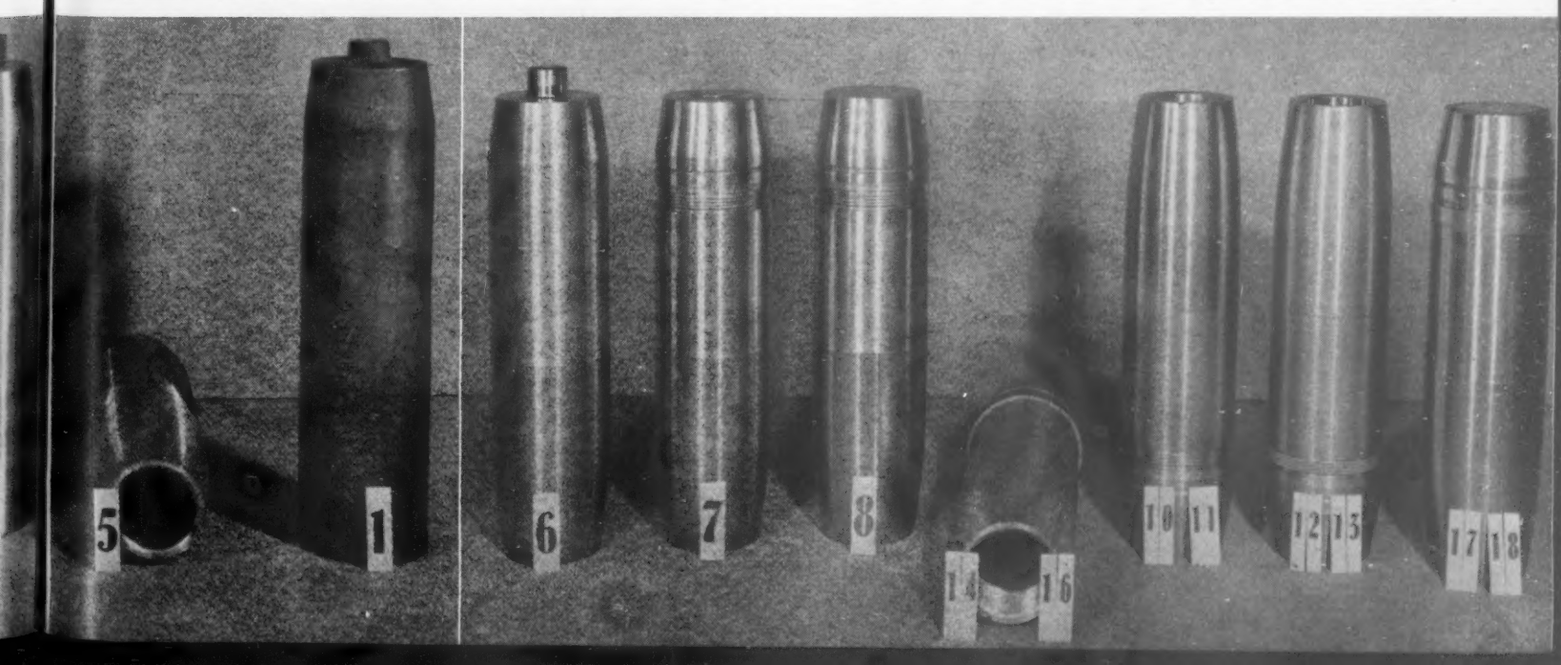
University of Virginia
University Station, Va.

other shell machiners) the shell is nosed cold. The operation is very simple and fast. While tightly clamped in a collet chuck, a nosing die descends upon the shell, closing in the metal around the nose without injury to the steel. Thus, the steel selected must machine easily but it must also stand this nosing treatment when cold and without subsequent heat treatment. Only shells of moderate size can be nosed without heating, as the load on the press becomes excessive and a cold squeeze impractical.

Next comes the boring of the nose and the chamfer-

TABLE I—Sequence for 75-millimeter, Mark 48, High-Explosive Shell with Cost Summary of Machines, Electrical Equipment, Tooling and Gages

Sequence Number	Operation Description	Time Seconds	Number of Units	Type	Manufacturer	Machines	Electric Equipment	Tooling	Gages	Total
0	Rough forging as received from forge shop	..	..	.....	.....	.....	.....	.....	.....	.....
1	Center and face open end	50	12	Special lathe	W. C. Lipe	$3987	$169	$492	$170	$4818
2	First rough turn	69	14	Special lathe	W. C. Lipe	7449	292	289	85	8115
3	Semifinish turn, face base	70	16	Standard lathe	W. C. Lipe	5283	185	826	195	6489
4	Form nose cold	13	3	Standard press	E. W. Bliss	6100	425	860	65	7450
5	Bore, face and chamfer open end	70	20	Special lathe	W. C. Lipe	4945	202	664	125	5936
6	Finish turn body	70	16	Special lathe	W. C. Lipe	5760	185	855	1183	7983
7	Cut band groove, remove center boss	70	16	Special lathe	W. C. Lipe	4945	202	633	254	6034
8	Grind base	25	2	Standard disc grinder	Gardner Mc. Co.	825	162	75	126	1188
9	Pressure test	70	1	Special	S. A. Woods	450	...	250	...	700
10	Stamp	10	2	Standard	Noble and Westbrook	600	...	240	...	840
11	Notch nose	19	2	Special	Morley Machine Co.	1305	87	555	50	1997
12	Knurl band groove	6	2	Special	Morley Machine Co.	880	...	22	...	902
13	Drill and tap $\frac{5}{16}$-inch hole	23	6	Standard	Chas. G. Allen	800	63	545	135	1543
14	Thread nose	49	11	Special	Lees-Bradner	4925	69	1115	410	6519
15	Wash	20	3	Special	G. S. Blakeslee	3000	...	...	...	3000
16	Press on band	16	5	Standard	West Tire Setter	2050	105	...	...	2155
17	Turn band	31	10	Special lathe	W. C. Lipe	4945	202	625	240	6012
18	Weld base plate	24	6	Special	National Elect. Welding	2275	62	300	...	2637
19	Weigh	5	1	Standard	Toledo Scale	200	...	15	...	215
20	Production inspection	50	..	Gages, etc.	.....	375	...	...	1818	2193
21	Government inspection	50	..	.....	.....	75	...	...	...	75
22	Tape and paint inside	12	..	Taping and spraying machines	.....	975	...	...	...	975
23	Paint outside	14	..	Spraco special spray booth	.....	825	...	...	...	825
24	Assemble closing plug, etc.	60	..	.....	.....	250	...	12	...	262
25	Box	27	..	.....	.....	50	...	...	...	50
	Tool grinders, cutting tools, air compressors, etc.	..	..	.....	.....	2090	...	530	...	2620
	Totals	..	..	.....		$65,364	$2410	$8903	$4856	$81,533



ing of the nose face to length. This is followed by finish turning in which the body of the shell, save for the band groove, is brought to its final form. The experienced machiner, in following this operation sequence, would probably want to simplify and perhaps consolidate some of these operations. See conveyorized layouts, page 63. However, there is a good deal of the craftsman about this particular organization, resulting in a finished job which has been held somewhat closer to size and concentricity than the letter of the specifications demands. For instance, actual eccentricities, I am informed, average about 0.0015-inch—some 10 or 15 per cent of the permissible amount.

Since there is no wave in the bottom of the band groove in this shell design, no waving attachment is required, the shell being held in a collet chuck and a form tool applied. Instead of waving, these crimping grooves are later knurled. This is done so the band will not rotate on the shell, thus failing to cause the shell to rotate about its longitudinal axis at high velocity which is necessary to transform the shell into a gyroscope to preserve its direction in space during flight. Actually it maintains a position nearly tangential to its trajectory, and so presents its nose to the target. The other function of the band, of course, is to act as a gas check or "piston ring" to bring the full effect of the propelling charge to bear on the shell.

The base grinding operation exhibits once more that extra care in manufacture about whose necessity there might be difference of opinion. Base grinding not only gives a nice finish for the welding on of the base plate but enables the operator to detect any flaws in the base of the shell before it is finally and definitely too late to do anything about it. Basal porosity, if undiscovered, may cause premature firing in the barrel of the gun and result in the loss of both gun and crew. However we would, in all probability, have to assume the combination of a porous base and a poor job of spot welding before this could occur, since the plate itself is made from flat rolled steel which would be extremely unlikely to give passage even to the very high pressure gases in the powder chamber.

This might appear to be an argument for ceasing to worry about flaws in the base of the shell; but experience has shown that even with this double precaution, maybe one in a million fails from one cause or another and premature explosion takes place.

The pressure test, I believe, has been abandoned. Thus stamping with the size and mark, and with the lot number and initials of the manufacturer, follows immediately. Nose notching is done on a regular milling machine, the shell being held in a collet head which can be rotated through 72 degrees as there are five notches. Knurling follows on a special machine; then threading on a thread miller, as the British do. Tapping, many manufacturers believe, is good enough.

The banding operation has some features of interest, inasmuch as we in this country prefer the direct thrust of the West Tire Setter with its multiplicity of hydraulic rams to the Davy type of press, which employs only one ram associated with a group of toggle arms which slide movable jaws inward against the band. The theory is that individual rams will produce a more even pressure over the surface of the band, and maybe there are good grounds for this belief. However, the great bulk of all the shell of large caliber manufactured in Britain during the last World war was successfully banded in this way.

The usual procedure is to slip the band over the shell, give it a "lick" with a hammer to set it into the groove at two points and place in the machine. It is considered good practice to press in with several squeezes, rotating the shell through 120 degrees after each squeeze. The copper, which is made as soft as possible by annealing before application to the shell, hardens up less if pressed in a number of stages than if an attempt were made to squeeze it in completely at one "go."

The band is now finished turned to close limits, the base plate welded on with the spot welder which runs around the periphery of the disk. By tapping the disk after welding, the experienced ear can tell whether the job has been done right.

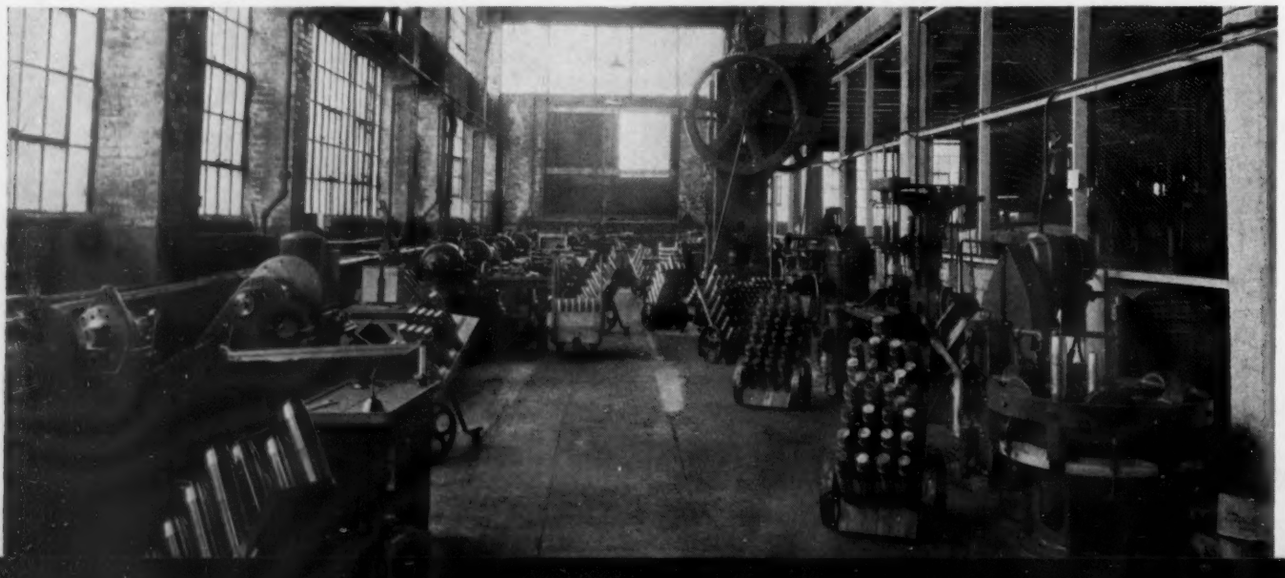
After weighing and inspection, paint is applied inside and out and the shell are ready for shipment to the loading plant where the charge will be inserted and fuse attached.

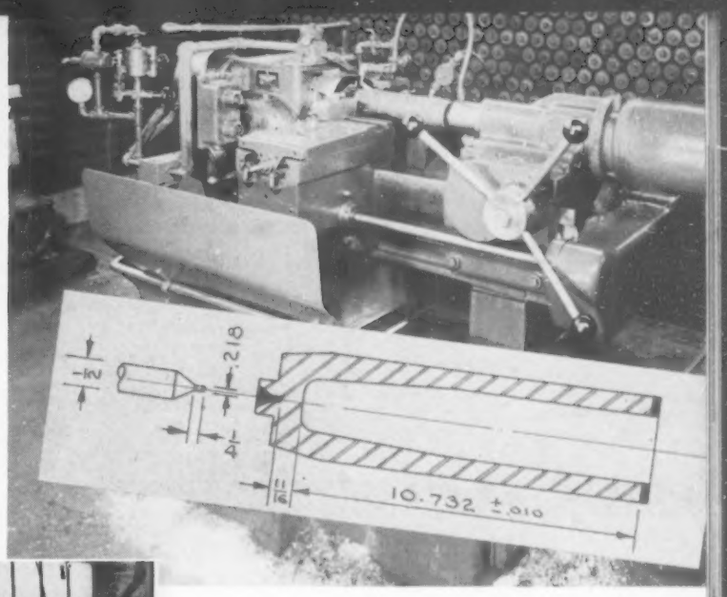
Captions with the accompanying set of illustrations detail each operation, describe how the operator works his equipment, the limits involved, the space required for the operation.

Other Articles on Production of Ordnance

■ **For other articles in addition to the series by Professor Macconochie, see issue of March 11, 1940, p. 38, for Design and Modern Methods of Making Shrapnel Shell; Dec. 2, 1940, p. 50 for Operation and Construction of Bofors Anti-aircraft Guns; Oct. 14, 1940, p. 160, and Jan. 6, 1941, p. 219, for How Technical Progress Aids Defense; Jan. 13, 1941, p. 48, for Some Typical Shell-Forging Methods; Jan. 20, 1941, p. 54, for Recommendations on Heating Billets for Shell Forging; Jan. 20, 1941, p. 74, for Making Cylinders for Packard V-12 Torpedo-Boat Engines; Feb. 10, 1941, p. 67, for New Method of Checking Gun Bores**

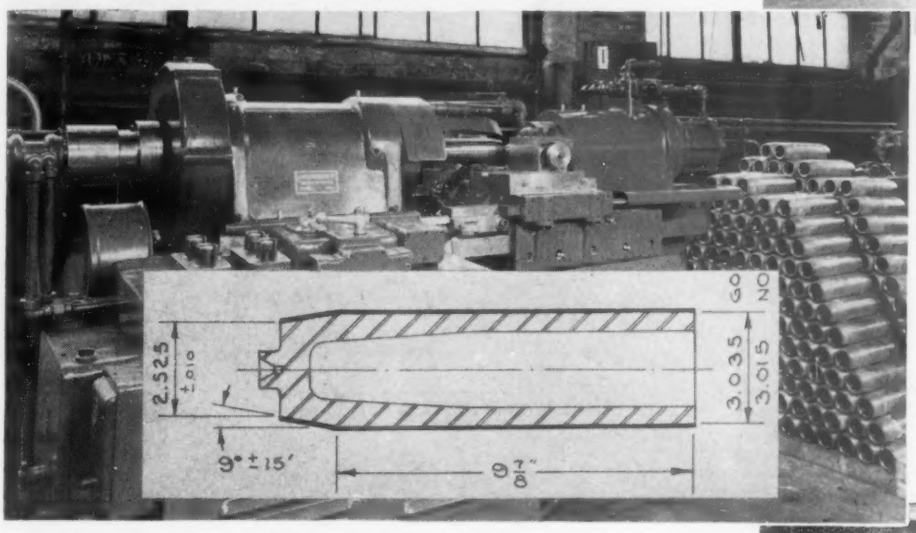
Layout of S. A. Woods shop at Boston, designed to handle an educational order for 75-millimeter high-explosive shell





—RIGHT—

Operation 1: Operator loads work on arbor, closes starting switch, automatically starting spindle. Tools rapidly approach work, complete feed cut and return to loading position and spindle stops ready for unloading. While machine is making this automatic cycle, the operator brings centering drill in position and centers the work to a positive stop, making every center the exact depth from bottom of cavity. As centering device is returned to loading position, it automatically recedes to rear of bed, providing loading room. Space required: 52 inches wide, 78 long, 52 high

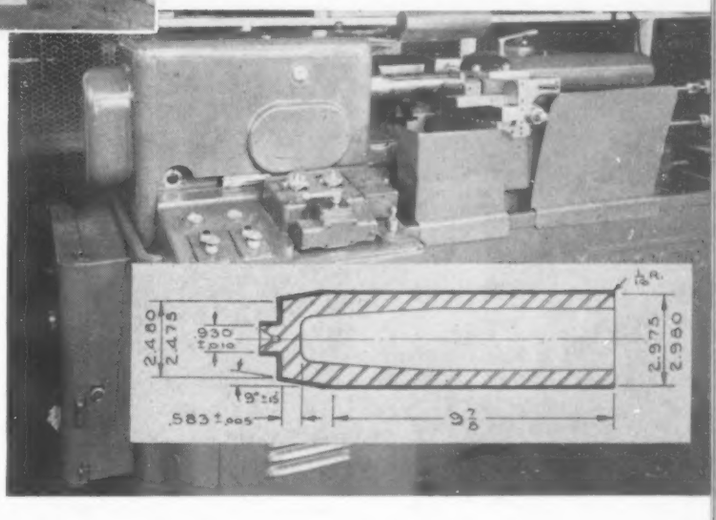


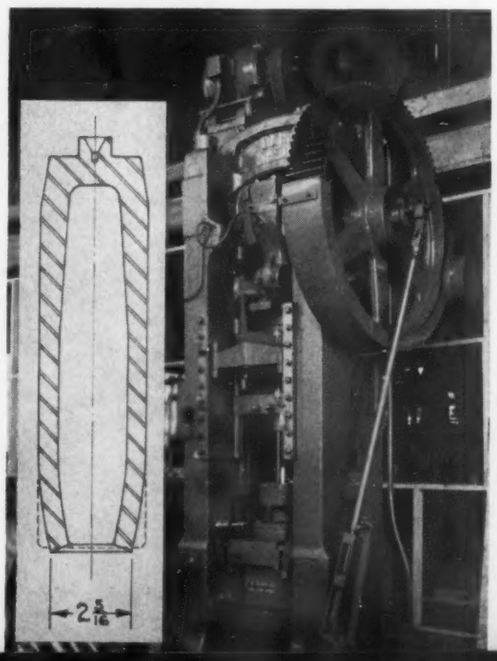
—LEFT—

Operation 2: Open end is centered and driven on a splined-type driver and held against this driver by an hydraulically operated live center tailstock. Registering the closed end from center, this produces a shell very concentric with cavity. After loading, the operator moves one control lever, automatically starting spindle, tools rapidly approach work, at finish of cut tools go into tool relief and rapidly return to loading position, machine automatically stopping, ready for unloading, making a complete automatic cycle. Space required: 72 inches wide, 94 long, 52 high

—RIGHT—

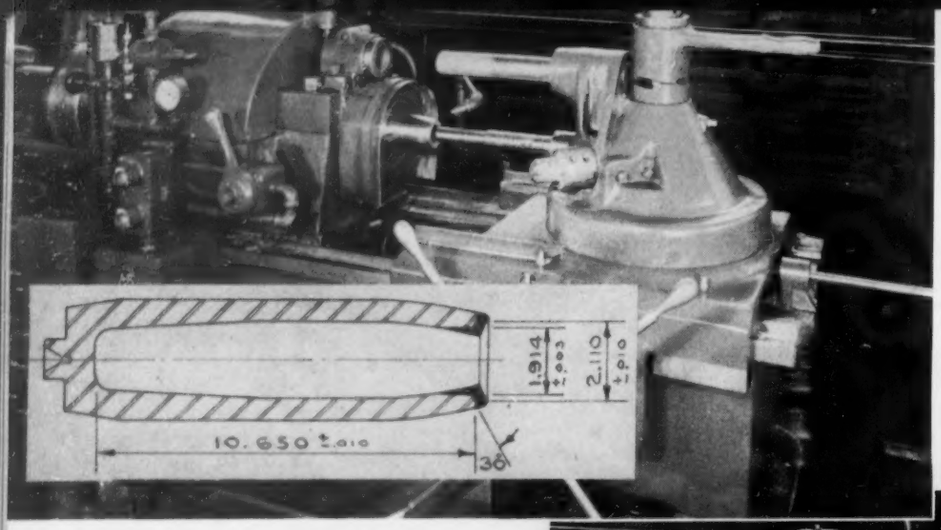
Operation 3: Open end of shell is held by expanding mandrel in cavity, registering lengthwise from face finished on operation one, and supported by live center in closed end. After loading, operator moves one control lever, automatically starting spindle, tools rapidly approach, take the cut, go in tool relief, rapidly return to loading position and stop. The back facing slide operates simultaneously with the front slide, making a complete cycle machine. This semi-finish cut reduces the amount of stock necessary to leave for finishing. Also, by holding outside diameter to closer limits, the shell can be cold nosed much more accurately and without any distortion to body or cavity, resulting in a more accurate, uniform finished product, eliminating several vexing problems on finishing operations and inspection. Space required: 45 inches wide, 96 long, 52 high





—LEFT—

Operation 4: Work is held in a collet-type fixture mounted on platen of the press. This collet grips the entire outside of shell on both body and bourrelet and registers endwise on finished face of closed end. Closing die held in ram with a kick out bar, operator pulls over lever, machine automatically makes one cycle and stops, ready for unloading. By holding all outside diameter dimensions close on operation 3, the shell can be gripped and supported very rigidly on this operation, preventing any distortion to body or cavity. Space required: 60 inches wide, 72 long, 185 high

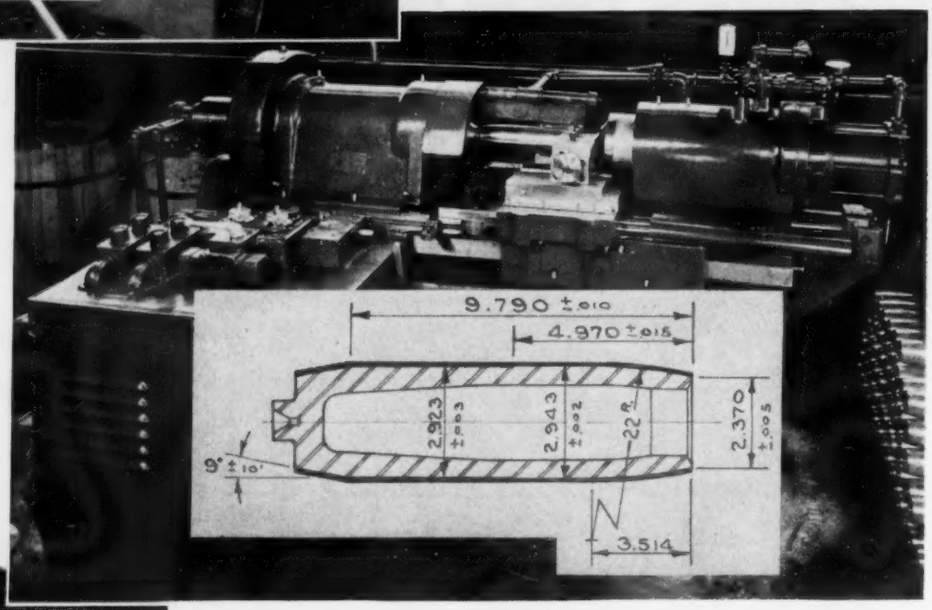


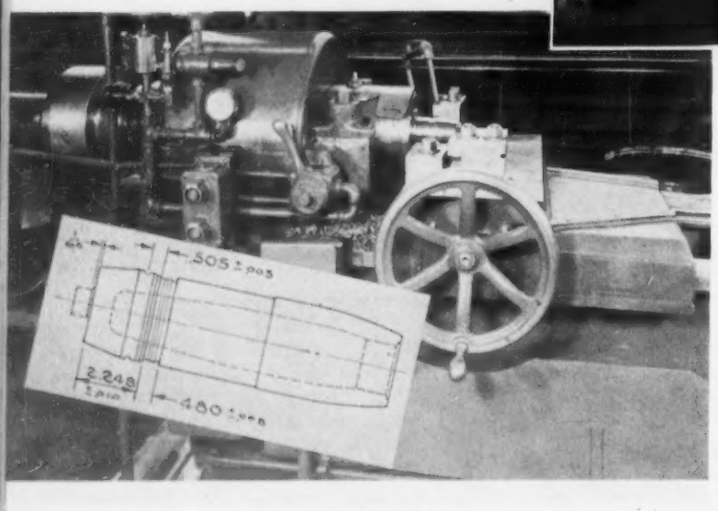
—LEFT—

Operation 5: Work is held in an air-operated collet, registering endwise against finished face of closed end, and supported at closed end by a spring loaded center. The boring bar carries three tools, one for boring, one for facing and one for chamfering, and is held in an indexing-type cam-locked turret. Turret has master guide bar to assure perfect alignment. Turret carriage is moved by hand through rack and pinion. Operator loads work in collet, starts spindle by push button, advances carriage and hand feeds tools through cut to a positive stop, returns carriage by hand. Space: 46 inches wide, 100 long, 56 high

—RIGHT—

Operation 6: Open end of shell is held by expanding arbor in bore, registering endwise against finished face of open end. Closed end is supported by ball-bearing live center hydraulically operated tailstock. Two turning carriages, the front turns the bourrelet and ogive, the rear turning the boat tail and body simultaneously. Each carriage controlled by separate cam bars. Operator loads work in machine, moves one control lever, automatically starting spindle; tools rapidly approach work, plunge cut to depth, go into fine feed for length of bourrelet then automatically change to a coarse feed for balance of cut, go into tool relief, rapidly return to loading position and entire machine stops, ready for unloading. Two-feed rate permits high production. Space: 45 inches wide, 68 long, 52 high





—LEFT—

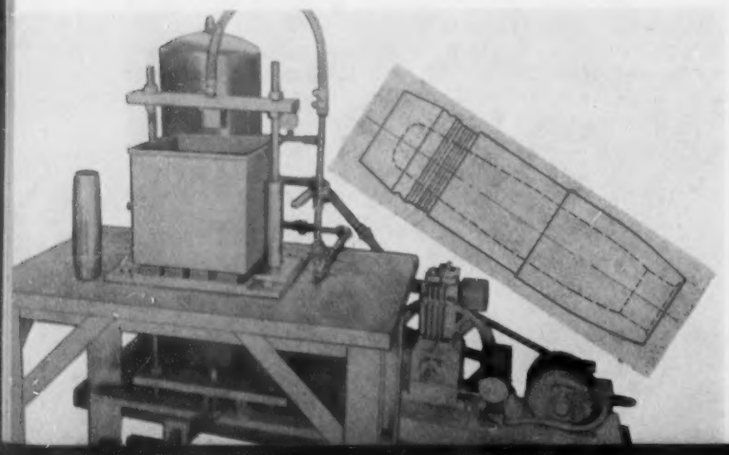
Operation 7: Work is gripped on outside diameter close up to band groove in collet, left, registered endwise from finished face of open end. With tools mounted in cross slide, center boss is faced off flush with closed end, band and locking grooves formed. Cycle of machine is as follows: Operator loads work in collet, starts spindle by means of push button, feeds cutting tools to positive stop by hand feed, returns tool slide to loading position, stops spindle by means of push button, ready to unload. Space required: 42 inches wide, 80 long, 56 high

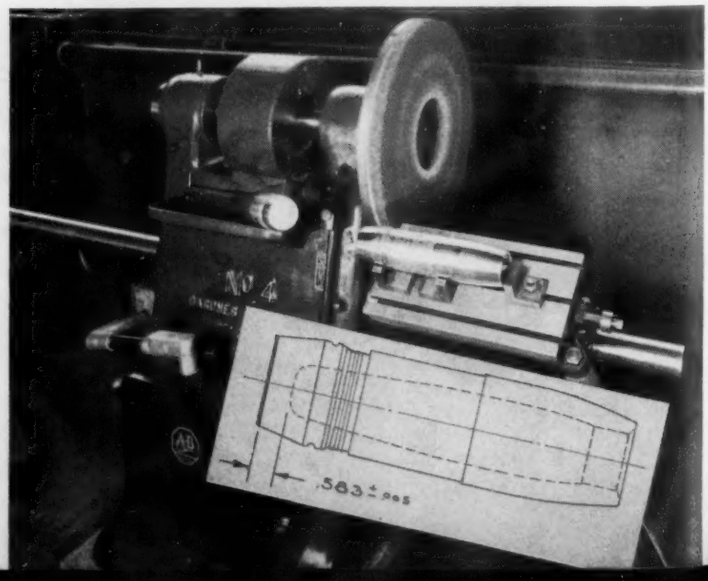
—BELOW—

Operation 8: Shell is located in V-blocks on swinging table of grinder located endwise against positive stop on open end, and brought up against wheel by hand lever, grinding shell to finish over all length and producing an absolutely flat, smooth surface for proper contact of base plate. Space required: 40 inches wide, 90 long, 52 high

—BELOW—

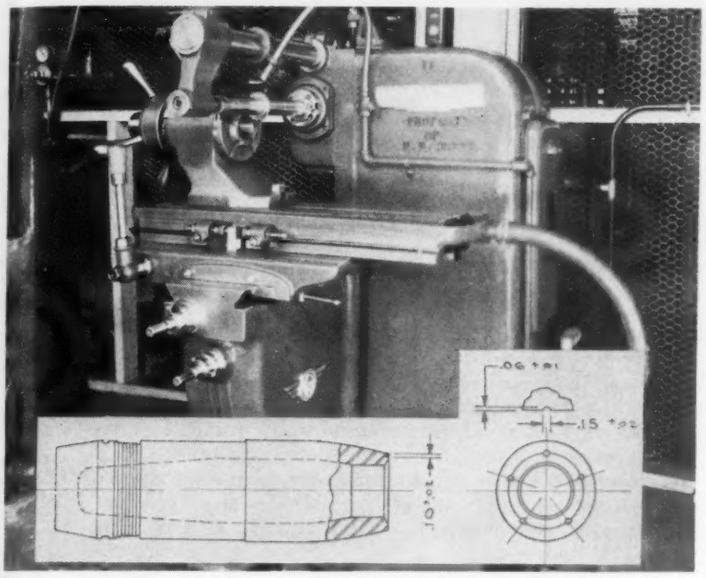
Operation 9: The shell is clamped into a fixture. Fixture and shell is then submerged in water and 100 pounds air pressure applied to inside of shell. This test is to check for seams, porosity, etc. only. Space required: 62 inches wide, 72 long, 62 high





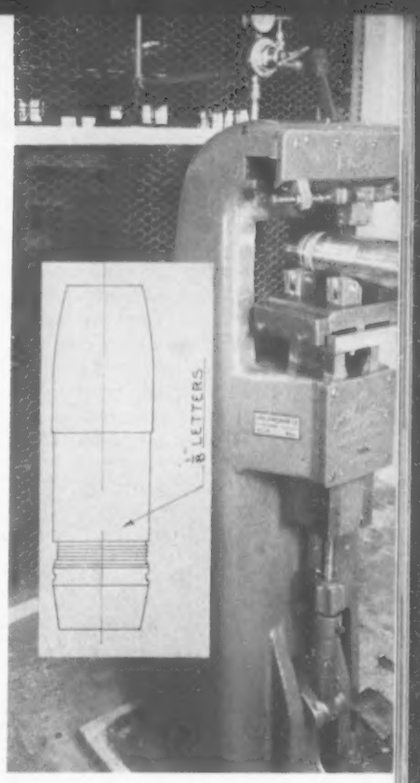
—RIGHT—

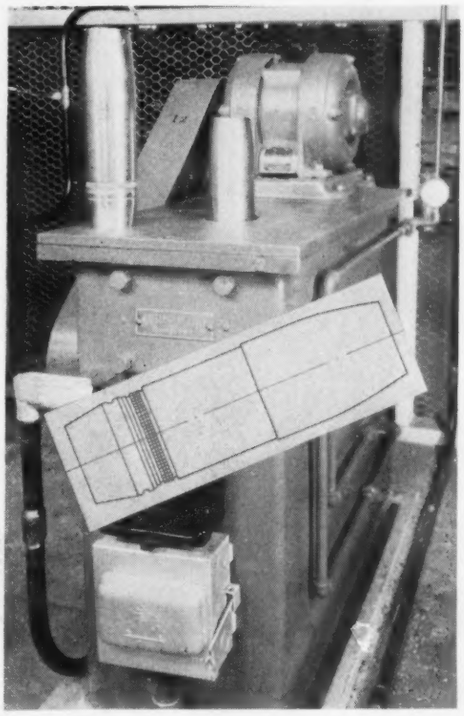
Operation 10: This consists of stamping the lot number, shell size and manufacturer's name on body of shell. The shell is held in a fixture and stamping die passed over body by means of rack and pinion slide, hand lever operated. As die passes over shell, the die rotates the shell, properly stamping it. Die is built-up type so the wording die can be changed quickly if desired. Space required: 20 inches wide, 20 long, 56 high



—LEFT—

Operation 11: The shell is positively held in quick-acting hand-indexing fixture mounted on table of milling machine. The cycle of operation is as follows: After loading work, operator moves table of miller forward to positive stop and returns to loading position by means of a hand lever, indexes fixture and repeats cycle until the five notches are completed, making a very simple, easily controlled operation. Space required: 48 inches wide, 40 long, 64 high



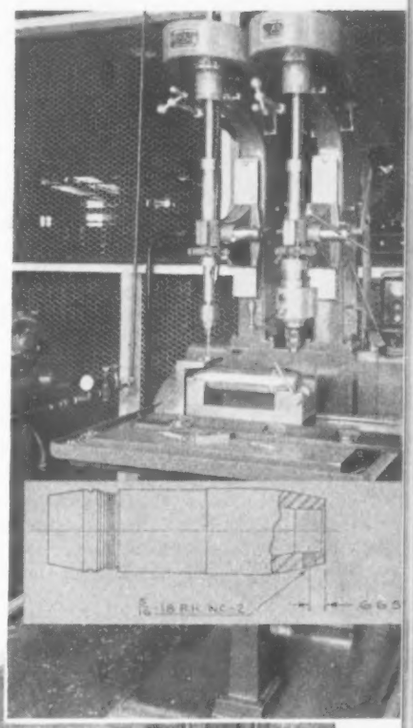


—LEFT—

Operation 12: The shell is placed in machine vertically, open end up, closed end registering on a positive stop. Rollers mounted on an air-operated slide force the shell into knurling tool the proper depth. The knurling tool and shell both rotate, producing a very accurate knurl with ease of operation, the air cylinder being foot treadle operated. Space required: 21 inches wide, 43 long, 44 high

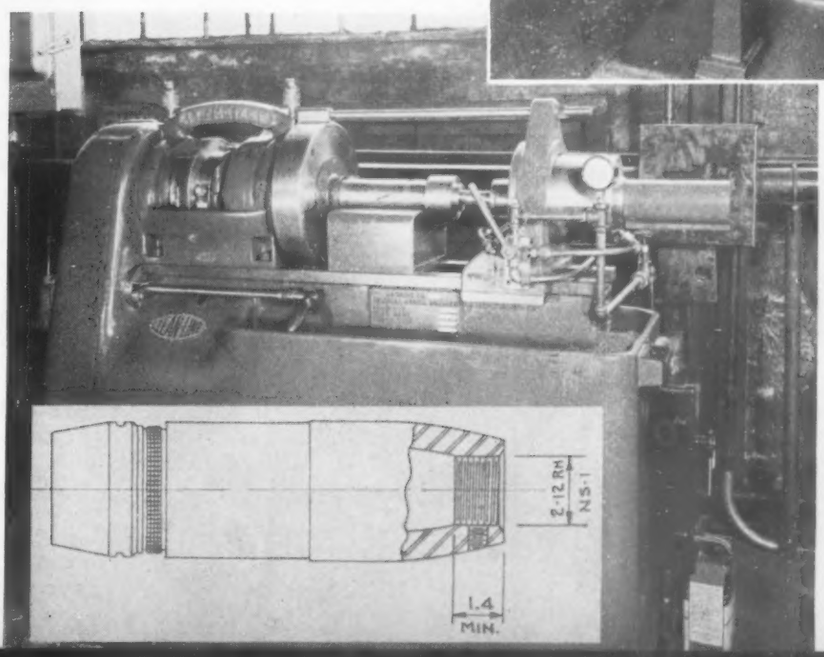
—RIGHT—

Operation 13: The shell is held in a quick-clamping indexing-type fixture, mounted on table of 2-spindle drill press. Hole is drilled, fixture indexed and hole tapped, without removing shell from fixture, making a very accurate yet simple operation. Space required: 36 inches wide, 42 long, 90 high



—RIGHT—

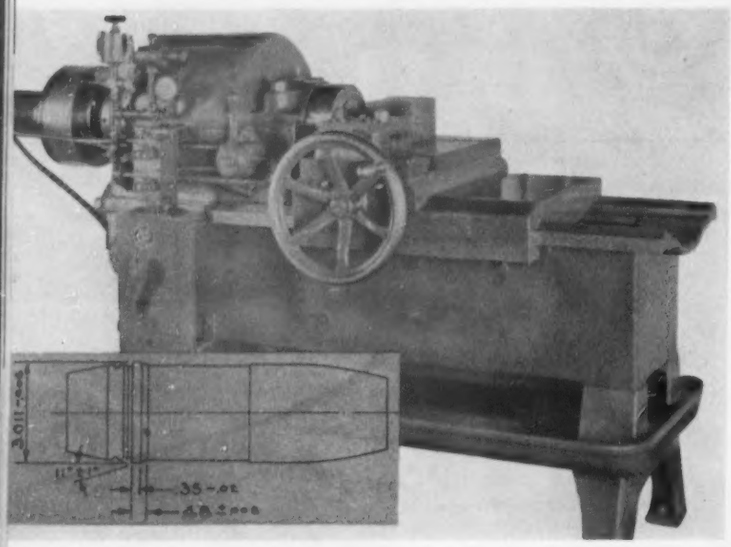
Operation 14: Work is held stationary in an air-operated type fixture. Operator moves one control lever, moving the cutter cams out to proper thread depth, makes one revolution and recedes to loading position, ready for unloading. While it is possible to tap this thread, it is believed that over a period of time enough saving in tap cost and scrap will be realized to warrant using this method of threading, which also improves the quality of the finished product and reduces inspection time. Space required: 36 inches wide, 60 long, 52 high

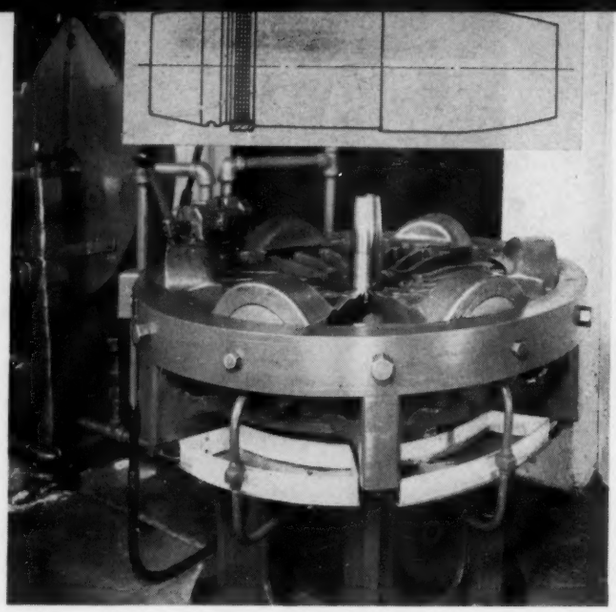


Operation 15: The operator places shell in washing machine on moving conveyor. The shell first passes through a wash pressure spray, which thoroughly cleans inside and outside, then passes on through rinse spray and into a steam bath, then into dryer. As shell leaves machine, it is thoroughly cleaned and dried preventing rust. Space: 38 inches wide, 120 long, 120 high; operation not shown

—RIGHT—

Operation 16: The operator places band over shell, places shell vertically into press, registering endwise against positive stop. Then by means of one single control lever, applies pressure to machine, releases pressure, rotates shell 1/3-revolution and again applies pressure, thereby pressing band into its proper groove very tightly and uniformly, releases pressure and removes shell, completing operation. Space required: 48 inches wide, 90 long, 60 high





—LEFT—

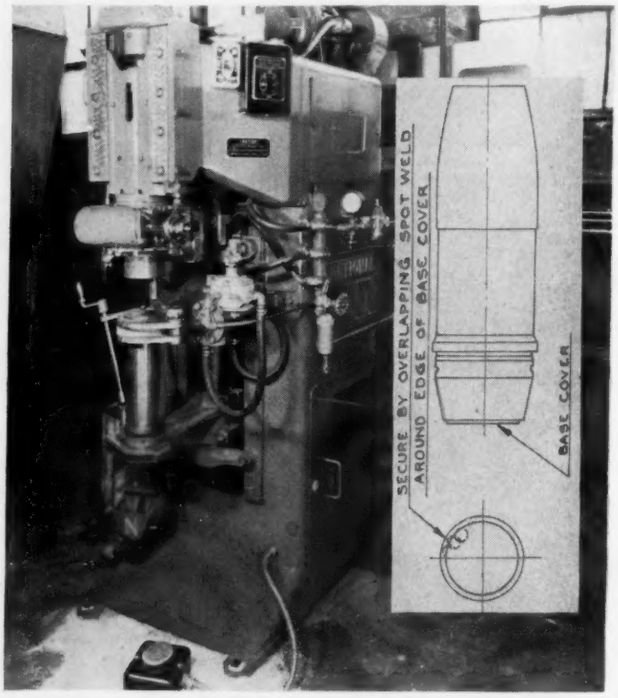
Operation 17: The work is gripped on outside diameter close up to band in air-operated collet, registering endwise from finished face of open end, with one form tool in machine cross slide, finish forming band. The cycle of machine is as follows: Operator loads work, pushes starting button, feeds cross slide into positive stop and returns slide to loading position by hand control. He then stops spindle by means of push button, and machine is ready for unloading. Space required: 42 inches wide, 80 long, 56 high

—RIGHT—

Operation 18: The work is held vertically in a very rigid air-operated clamping device, registering against open end of shell. The cycle of machine is as follows: Operator places work in fixture, lays base plate on end of shell and starts machine by means of a foot control. The machine automatically indexes spot welding the entire outer edge of base plate to closed end of shell. Space required: 50 inches wide, 40 long, 72 high

Operation 19: Work is placed on a weighing machine which has direct reading dials, instantly showing if weight of shell is within specification limits or how much it may be out. Space: 18 inches wide, 33 long, 60 high; not shown

Operation 20: This operation consists of checking and cleaning out threads, checking cavity for dirt or scale, and wire brushing if necessary; also, checking bourrelet diameter and concentricity. This inspection greatly simplifies the government inspection, keeps the production line under control, prevents rejections by the government inspector, and reduces scrap. The government inspector is supposed to work in conjunction with the production inspector only. The production inspector works in conjunction with the production department, insuring proper information being issued and harmony at all times. Space required: 120 inches long, 36 wide, 36 high; operation not shown



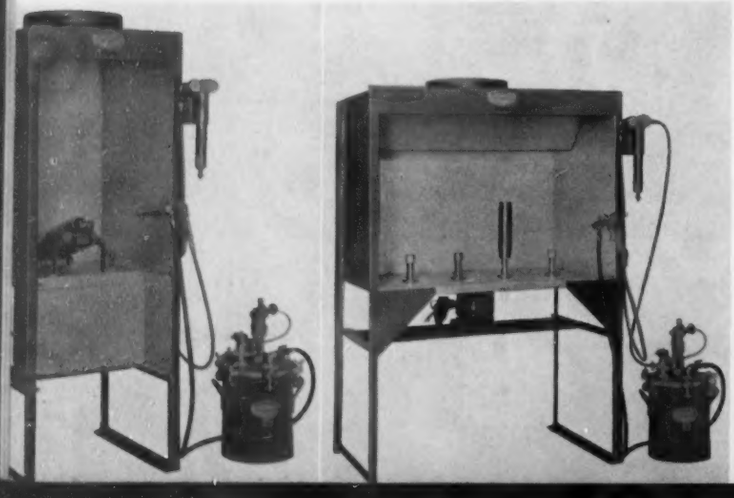
Operation 21: The government furnishes all inspection gages and tools. The manufacturer supplies one 10-foot inspection bench with two drawers, hard wood top, varnished and fitted with gage rack. Space required: 120 inches long, 36 wide, 36 high; operation not shown

—EXTREME LEFT—

Operation 22: The operator tapes the rotating band with masking tape on a specially built taping machine by laying the shell into V-type rotating rollers which revolve the shell, and applies the tape. Then the shell is placed into spray booth onto rotating V-type rollers and as shell rotates, the inside is sprayed with the proper paint, making this a very fast, clean operation. Space required: 30 inches wide, 60 long, 72 high; operation not shown

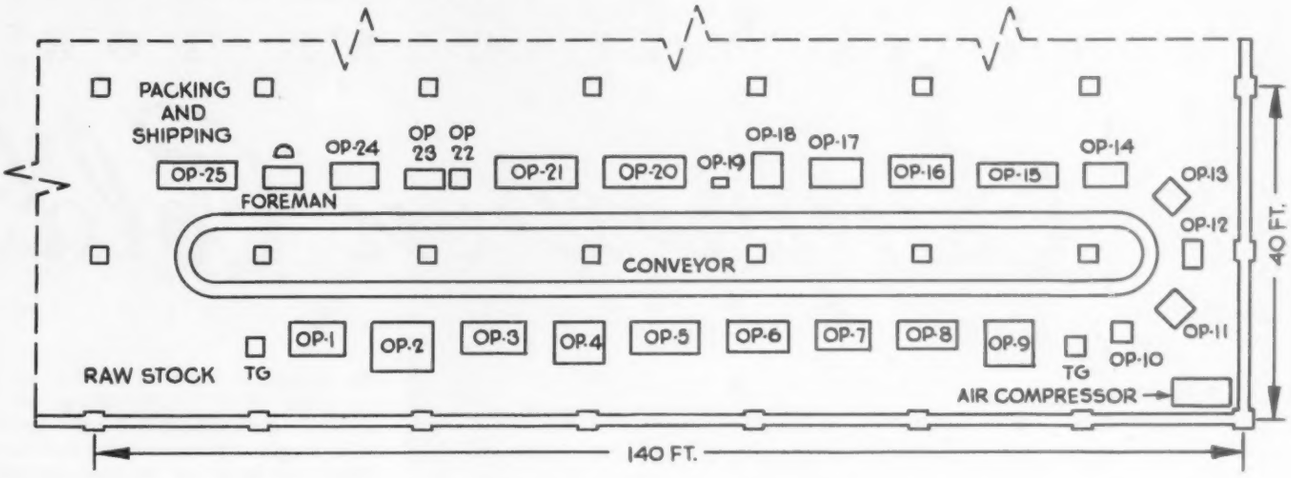
—LEFT—

Operation 23: The operator places shell on rotating power-driven plug in paint spray booth and applies paint with spray gun as shell rotates. The paint spray booth is supplied with exhaust system, power-driven rotating fixture, making a neat, clean painting unit simple to operate. Space required: 30 inches wide, 60 long, 72 high



Operation 24: The operator assembles the closing plug in the open end of shell, screwing same down tight by means of a power-driven tapping machine, assembles the set screw and removes the masking tape from copper band and inspects paint job. Space required: 36 inches wide, 36 long, 36 high; operation not shown

Operation 25: The operator places six completed shells in shipping carton and tapes the cover down tightly, ready for shipping. Space required: 36 inches wide, 120 long, 32 high; operation not shown



List of Operations and How Set Up for Progressive Conveyor Layout No. 1 or No. 2 Producing 342 Shells per 8-Hour Shift, 50 Minute Hour, Total Minutes per Piece, 15.13

Operation

No. 1—Load shell on conveyor dollies, center and face open end. One operator. 70 seconds.

No. 2—First rough turn. One operator. 69 seconds.

No. 3—Second rough turn, face base and while machine is making cycle, operator will do operation 4, cold nosing on press. One operator. 70 seconds.

No. 5—Bore nose. One operator. 70 seconds.

No. 6—Finish turn. One operator. 70 seconds.

No. 7—Cut band groove and remove boss. One operator. 70 seconds.

No. 8—Grind base and combine operation 9. Operator will load work in test fixture and submerge, then grind base on shell finished tested. This allows shell in test fixture to show up leaks. Machine is then unloaded and repeats above cycle. One operator. 70 seconds.

No. 10—Stamp. Combine operations 11, 12 and 13 with this operation. One operator. 70 seconds.

No. 14—Thread nose. Combine operation 15 with this operation. One operator. 69 seconds.

No. 16—Press on band. Combine operations 17 and 18 with this operation. One operator. 70 seconds.

No. 19—Weigh. Combine operation 20, checking gages, etc. One operator. 70 seconds.

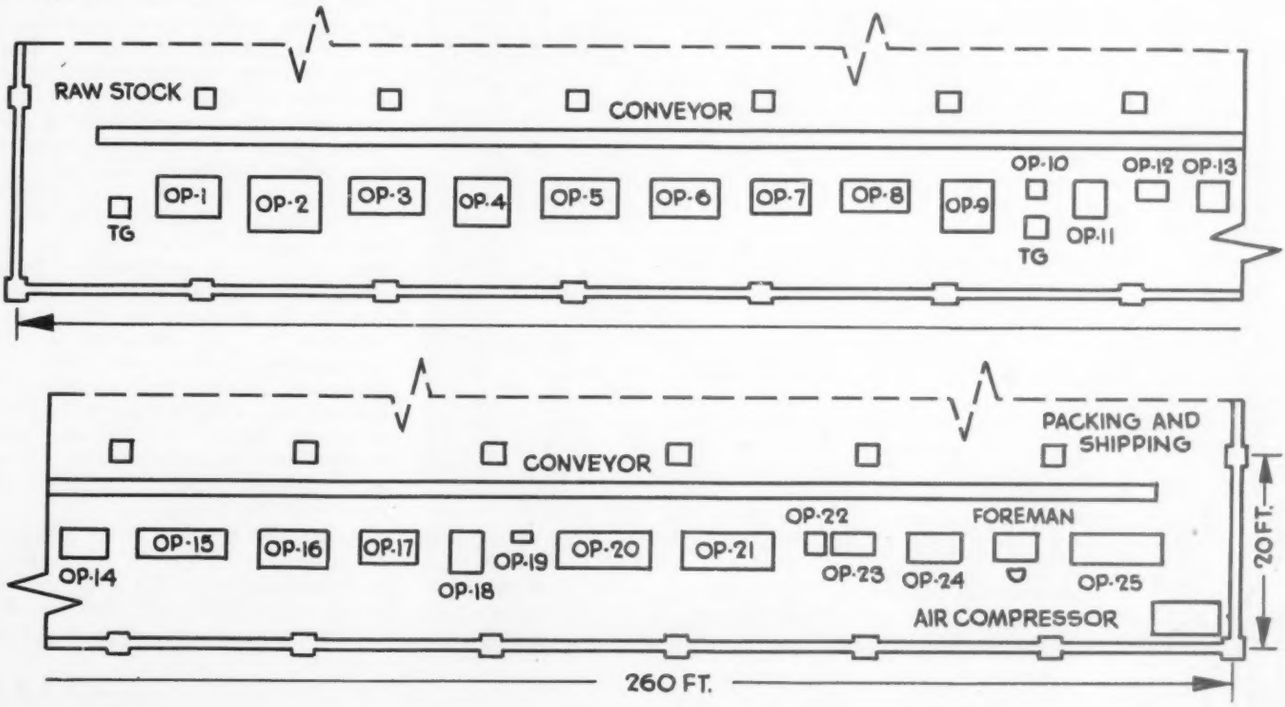
No. 21—Government inspection.

No. 22—Paint. Combine operations 23, 24 and 25 and clean empty conveyor dollies. Two operators. 140 seconds.

Man Power Estimate

1—Foreman.
1—Chief floor inspector.
1—Production inspector.
2—Tool grinding and setup men.
1—Janitor.
1—Chip man.
1—Stock man.
13—Operators.
1—Maintenance man.
1—Clerk.

Total man power per 8-hour shift: 23



HERE IS THE CASE FOR

Compression Cold-

Do you know the reason why some authorities say that cold rivets, when driven properly and with the correct shape of head, give best results? Here Mr. Osborne explains the reasons for this superiority and backs them up with test results. Actual production work, too, has shown the correctness of the points brought out here. Today, large cold compression-driven rivets are being specified by the United States Army, Navy and many other critical users

■ THERE was a time when it was not uncommon to encounter steel that was brittle at temperatures under 100 degrees Fahr. Of course rivets of such a material could not be driven cold since they would crack or shatter. Thus there was good reason for specifying hot-driven rivets. Also, there was a long period before suitable compression riveters were available for driving rivets cold, especially in sizes over ⅛-inch. However, neither reason for use of hot-driven rivets exists today.

The advantages obtained by driving rivets while cold are not well known; at least few steel fabricators appear aware of them. Possibly this is because some tried cold riveting with little success and abandoned it without sufficiently investigating the subject.

Driving rivets while cold, however, is well worth the most serious consideration because a number of very definite advantages accrue. As explained in the first article of this series, see STEEL, March 10, 1941, p. 56, best results in cold riveting are obtained with compression riveters. This method of cold riveting is considered here exclusively. To understand the advantages of the process, it is necessary to be somewhat familiar with the theory of riveting and upsetting. In an investigation of this subject, a summary of the theory of riveting and upsetting was prepared. Table I gives 15 important points. As will be shown, this theory is backed up by actual test results.

The advantages of driving rivets cold and the theory underlying them are as follows:

Fill the Hole: It has long been known that hot-driven rivets will not fill the hole beyond a certain distance from the driven head. This distance is about twice the diameter of the rivet shank. With grips five to seven times the rivet diameter, hot-driven rivets will not fill the hole at all in many cases. While various attempts have been made to fill the hole by using specially shaped heads or shanks, by cooling the point of the rivet, etc., they have proved unsatisfactory. When a rivet is driven hot, the steel of the shank is plastic, so the pressure imposed by the dies is transmitted only a short distance from the driving point. Especially is this true of the formed head at the opposite end from that being driven, although by deforming the manufacturer's head some pressure may be made to extend a little distance below that head. This is in accordance with item 7, Table I. Therefore, as stated in item 1, the metal will be upset for a limited distance only along the shank of the rivet and will tend to fill the hole for that distance only.

When driving rivets cold, the metal of the rivet is elastic, not plastic. Up to the elastic limit or flow point, the pressure imposed by the riveting dies of a compression riveter will be transmitted through the entire length of the rivet, assuming that the rivet is slightly smaller than the hole and that friction in the hole is neglected. This is in accordance with items 4 and 5, Table I. Therefore the tendency for the shank to swell or upset, assuming that it is uniform in cross section, is equal throughout its entire length. Thus when the pressure on the rivet reaches the flow point of the metal, the shank swells throughout its entire length and will continue to flow evenly with increasing total pressure. When it reaches the size of the hole, the portion in the hole will be restricted in swelling, and the portion outside the hole will continue to flow and form the rivet head, at the same time causing the rivet in the hole to exert pressure on the metal surrounding it.

Seals Hole Tightly: As the pressure is increased after the hole is filled, the friction in the tightly filled hole caused by the pressure of the shank on the surrounding metal will cause this pressure to be decreased as the distance from the point of pressure application increases in accordance with item 6. The effect produced will tend to countersink the hole. With reasonable pressures, this effect will be slight and is an advantage as it insures tightness and freedom from leaks since shrinkage in the shank due to its elasticity is thus compensated by the elasticity of the surrounding metal, per item 8. However, if excessive pressure is applied to the rivet, this side pressure will enlarge the hole beyond reason and damage the members being riveted. Also, the steel of the rivet may be damaged.

Figs. 1, 2, 3 and 4 show a series of ¾-inch rivets driven in material 4 inches thick. Fig. 4 is a cold-driven rivet. Note it fills the hole completely from end to end, even with ex-

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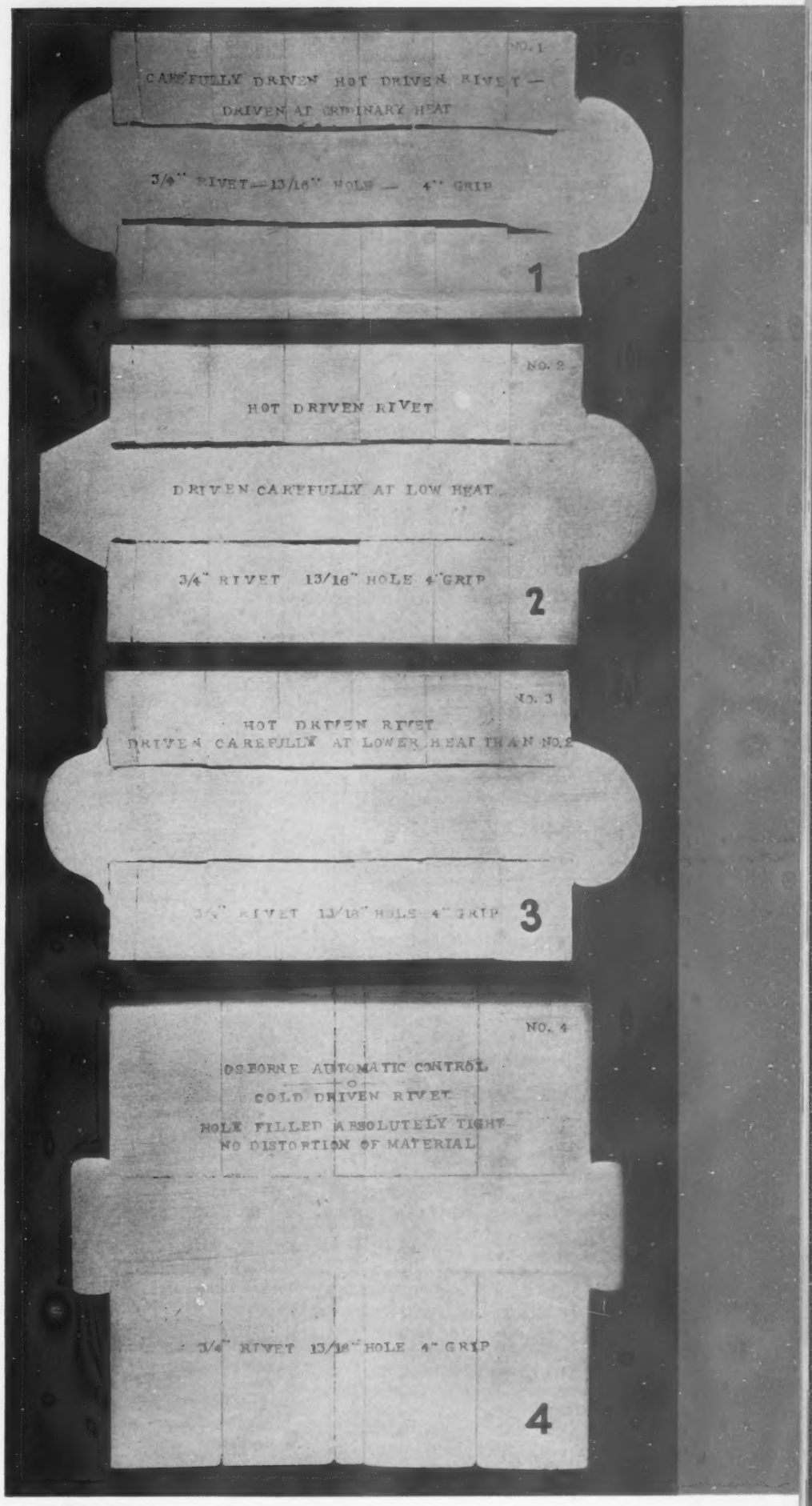
Pittsburgh

Riveting

tremely long grips. The hot-driven rivets were driven as carefully as possible, even to the extent of straightening the point of the rivet when it started to bend in driving. In spite of this care, the hole is filled at practically no point. The cold-driven rivet was driven down without stopping and with only usual care in driving. Note that although the grip is five and one-third times the rivet diameter, being a ¾-inch rivet and a grip of 4 inches, the hole is filled completely. Note the cold-driven rivet does not deform the surrounding steel to any extent, there being only a slight countersinking or fillet effect at the neck of the rivet. This is not sufficient to harm the members but rather is a benefit as it assures a tight seal.

Fig. 1 is a section of a rivet driven at a cherry-red heat. Practically no filling of the hole was obtained, and the rivet bent, preventing satisfactory driving. The rivet in Fig. 2 was driven at a somewhat lower heat with better filling obtained, although far from complete. Even better filling was obtained with the rivet in Fig. 3, driven at a still lower heat.

Fig. 2 is a good example of a hot-driven rivet. It will test tight but is so only from end tension on the head. The shrinkage from cooling can be noted. The swelling or upsetting of the shank in the hole ceases at a depth of two diameters,



A series of ¾-inch rivets driven in material 4-inches thick. Fig. 1 shows a rivet heated to ordinary driving temperature and driven as carefully as possible, even to the extent of straightening the point of the rivet when it started to bend in driving. Fig. 2, similar rivet but driven at a lower temperature. Fig. 3, rivet driven at still lower temperature. Fig. 4, rivet driven cold. All of them were driven in 13/16-inch holes

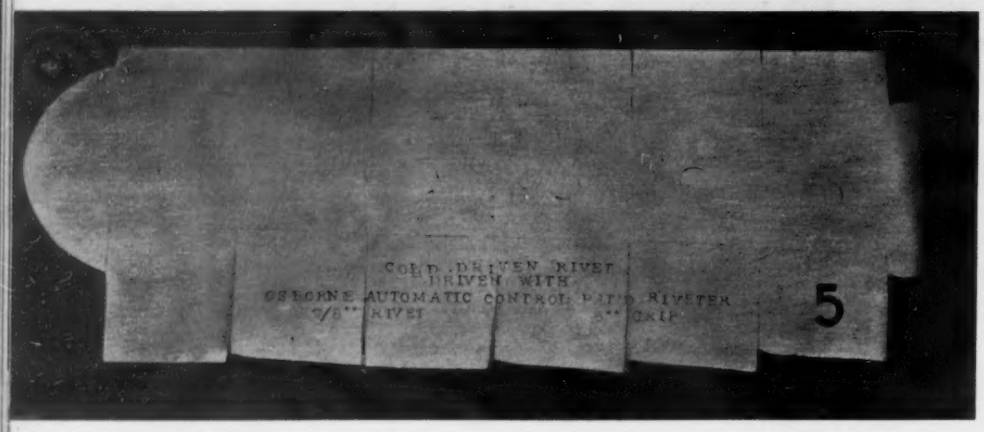


Fig. 5—A 7/8-inch rivet driven cold through 6 inches of material to fill completely the hole. Note it is not a drive fit, usual rivet clearance was employed

as might be expected from item 1, Table I.

The rivet driven cold in Fig. 4 completely fills the hole as it would be almost impossible to see its outline of the rivet except for the rusty contact surfaces. It was from a series of tests such as these specimens made up for the United States army engineers that the government has adopted and specified compression cold riveting for much heavy work.

Strength Shows in Tests

That this filling of the hole completely is characteristic of cold riveting is shown by many tests on various size rivets in thicknesses of material up to seven times the diameter of the rivet. Fig. 5, for example, shows a ⅞-inch rivet driven in material 6 inches thick with the hole filled completely from end to end—an unusual grip. The blank lines partially outlining the rivet are from scale made on the rivet during manufacture. In this illustration, the small black circles along the axis of the rivet are screws set in the sample to hold it from being knocked apart. A rivet of this ratio of grip to diameter completely filling the hole was unknown until compression cold riveting was developed successfully. Please note it was not a drive fit in the hole.

In another test with a somewhat shorter grip of 4 inches, hot-driven rivets had a maximum enlargement of 1/32-inch right near the driven head, with no enlargement at all in some cases. Cold-driven rivets all showed an enlargement to the size of the rivet holes throughout the length of the rivet. Tightness produced by the countersinking effect has been noted in several outstanding examples. One instance occurred in which ⅞-inch rivets in a connection on a water tank were subjected to far more than they could stand and pulled in two at the contact surfaces of the plate with a 40-foot head of water behind them. They had been driven cold and no leaks occurred. It would have cost a considerable sum to have drained the tank and redriven a properly designed joint. But because the rivet pieces remaining in place were absolutely tight, it was possible to repair the tank at little expense. The pieces of rivets are still tight in the holes after several years.

No Temperature Shrinkage: When rivets are driven hot, they are at a much higher temperature than the surrounding metal, so on cooling they contract to assume a diameter less than the hole, which thus cannot be completely filled in any instance. Also, they will endeavor to shrink longitudinally. Being unable to do so, they will stretch, inducing tension in the shank and still further reducing the diameter. While these reductions are slight, they are sufficient to allow leakage and vibration of the rivet if the tension on the head is relieved. See item 10, Table I. Note that per item 9, this tension will tend to be relieved with live loads, vibration or shock.

With rivets driven cold, there is no temperature shrinkage of the rivet shanks, therefore no inducing of excessive strains on shanks or heads. There is no tendency on the part of the rivet to become loose or leak under live loads or shock, nor will severe strains cause looseness. Tests have shown that the rivet may even be pulled apart without causing leaks as the friction in the tightly filled hole will prevent the rivet from necking down anywhere throughout its entire length—provided, of course, that the strain does not enlarge the hole.

The tension in the shank of the hot-driven rivet is easily shown by the manner in which the head may be snapped off under a few blows of a maul. Under same conditions,

TABLE 1—Theory of Upsetting and Riveting

1—A piece of metal will be upset under pressure only as far as the pressure is transmitted through it.
2—The area of the upset portion will be the total pressure divided by the flow pressure per square inch for the metal, unless the flow is restricted.
3—Restriction effect is very considerable as caused by the resistance to the flow of the metal across the surface of the pieces exerting the pressure, and is materially affected by the distance between these surfaces. Also any restraining shape of these surfaces increases the apparent flow pressure greatly.
4—The pressure that will be transmitted through a metal is directly proportional to the internal resistance to flow of the metal. This is true only of elastic materials.
5—Elasticity is necessary for the transmission of pressure.
6—Pressure will be lost in proportion to the exterior resistance to flow, i.e., friction.
7—Plastic materials can transmit pressure for but a certain distance when unconfined, which distance is inversely proportional to the plasticity of the material. The pressure tapers off to zero at this point.
8—The deformation of steel under pressure within the elastic limit will lessen proportionally to the decreasing pressure.
9—Excessive or over strains in steel will tend to reduce with vibration or shock by normalization, accompanied by deformation.
10—When steel is heated it expands and when cooled it contracts.
11—The liability of steel to fibre damage and cracking when cold worked increases with hardness.
12—The more uniform the steel is, the more uniform will be the results of cold working or upsetting.
13—Annealing makes steel more uniform and increases its ductility.
14—Within limits cold working increases the strength of steel without loss of its good qualities.
15—Excessive cold working of steel damages the fibre and lowers the quality and strength and safety of it.

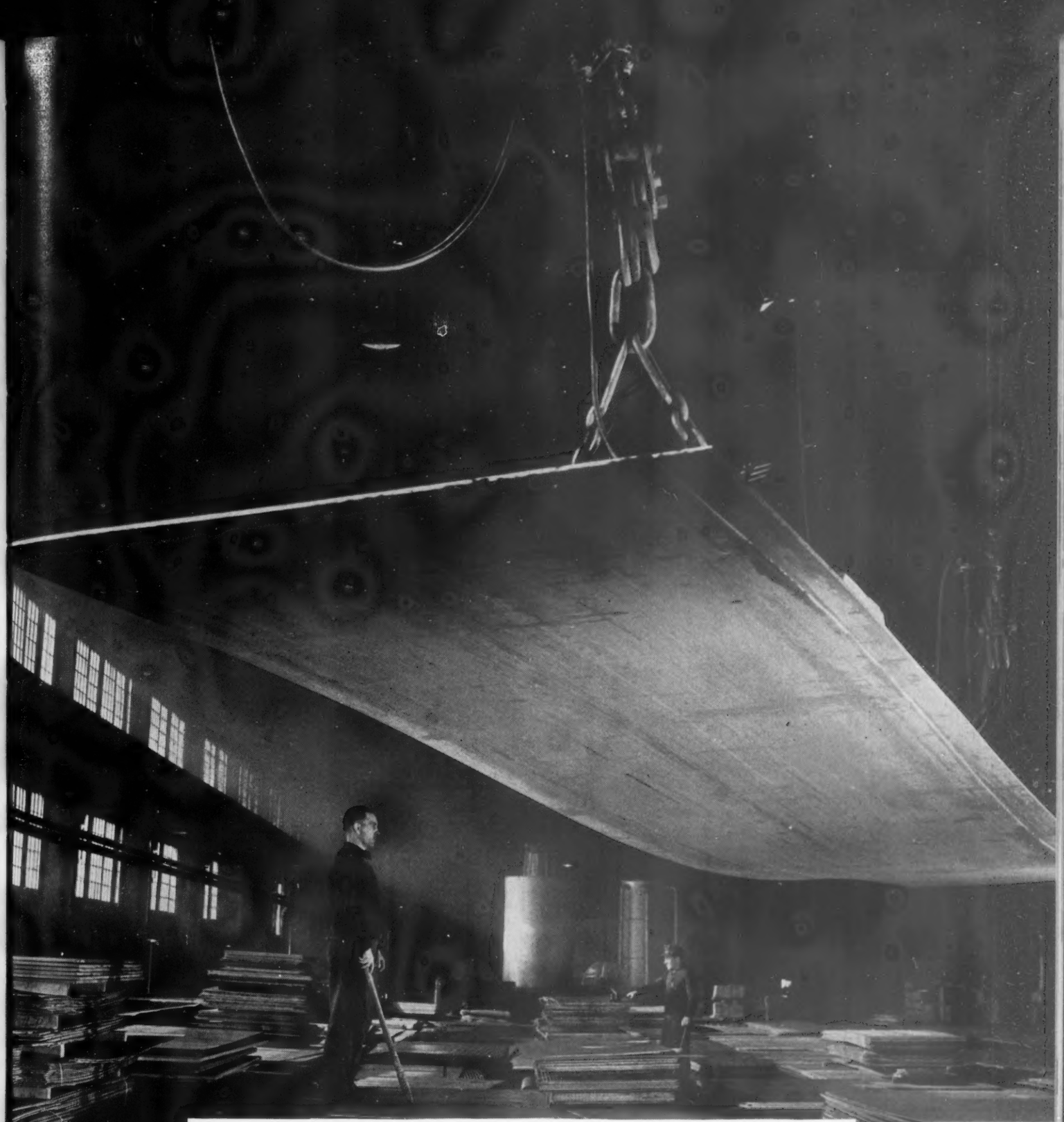


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TABLE II—Shock Resistance

Head	Rivet No.	Driven	Blows Required	Remarks
Formed	1	Cold	29	Clean break
Driven	1	Cold	85	Head gradually cut off
Formed	2	Hot	9	Clean break
Driven	2	Hot	22	Clean break
Formed	3	Cold	27	Clean break
Driven	3	Cold	24	Head gradually cut off
Formed	4	Hot	11	Clean break
Driven	4	Hot	12	Clean break

TABLE III—Tension Tests

Mark	Rivet	Driven	Load	Ultimate Strength Pounds per Sq. In.	Remarks
B-2	⅞	Hot	48,140	69,000	Rivet broke in shank
B-3	⅞	Cold	49,640	72,000	Head pulled off. Poorly driven.
B-4	*⅞	Cold	51,300	74,000	Rivet broke in shank
B-5	⅝	Hot	33,590	64,500	Rivet broke in shank
B-6	⅝	Cold	40,160	78,000	Rivet broke in shank
B-8	*⅝	Cold	37,850	73,000	Rivet broke in shank

*Annealed rivets.

TABLE IV—Double Shear Tests of Hot and Cold-Driven Rivets

Mark	Rivet	Driven	Holes	Total Ultimate Strength	Ultimate Strength Per Sq. In.	Remarks
A	⅝	Hot	Punched	48,300	47,000	
B	⅝	Cold	Punched	62,600	61,000	
C	*⅝	Cold	Punched	45,930	45,000	
D	⅝	Hot	Drilled	42,820	41,500	
E	⅝	Cold	Drilled	62,700	61,000	
F	*⅝	Cold	Drilled	47,170	46,000	
G	⅞	Hot	Punched	60,780	43,500	
H	⅞	Cold	Punched	67,700	48,500	
K	*⅞	Cold	Punched	67,700	48,500	
L	⅞	Hot	Drilled	72,570	52,000	
M	⅞	Cold	Drilled	66,950	48,500	
N	*⅞	Cold	Drilled	67,240	48,500	

*Annealed Rivets.

TABLE V—Single Shear Test of Hot and Cold-Driven Rivets

Mark	Rivet	Driven	Holes	Ultimate Total Strength	Strength Ultimate Per Sq. In.	Remarks
P	¾	Hot	Punched	47,850	46,500	Two rivets
Q	¾	Cold	Punched	63,850	62,000	Strength of one
R	*¾	Cold	Punched	52,060	51,000	rivet is one-half
S	¾	Hot	Drilled	49,230	48,000	total ultimate
T	¾	Cold	Drilled	59,550	58,000	strength
U	*¾	Cold	Drilled	58,280	52,000	
W	⅞	Hot	Punched	61,130	44,000	
X	⅞	Cold	Punched	76,530	55,000	
Y	*⅞	Cold	Punched	73,850	53,000	
Z	⅞	Hot	Drilled	80,100	57,000	
AA	⅞	Cold	Drilled	85,100	61,000	
BB	*⅞	Cold	Drilled	70,550	51,000	

*Annealed rivets.

Fig. 6—A compression riveter driving cold rivets in a roller dam section for the United States government, at plant of Dravo Corp., Pittsburgh

a cold-driven rivet head will not snap off; in fact it must be chiseled off.

Tests to determine the shock resistance of cold-driven rivets were made by determining the number of blows with a heavy maul necessary to knock off the rivet heads. Eleven rivets were driven through four bars of steel 6 inches wide, ¾-inch thick and 3 feet 8 inches long. Table II shows test of four rivets as well as the average figures for all eleven. Note the many more blows that were necessary to knock off the cold-driven rivet heads.

Greater Permanent Strength: Because a cold-driven rivet can be made to fill the hole completely, producing a good friction grip on the sides of the hole, and because a certain amount of counter sinking is produced in the surrounding metal near the head, there is good reason to expect that the strength of the cold-driven rivet would exceed that of a hot-driven rivet. Actual tests reveal this to be true. In a setup for testing tensile strength of rivets, crossed test pieces, riveted together, were pushed apart by two yokes. Table III presents results of tests that show cold-driven rivets have a uniformly higher ultimate strength than hot-driven rivets.

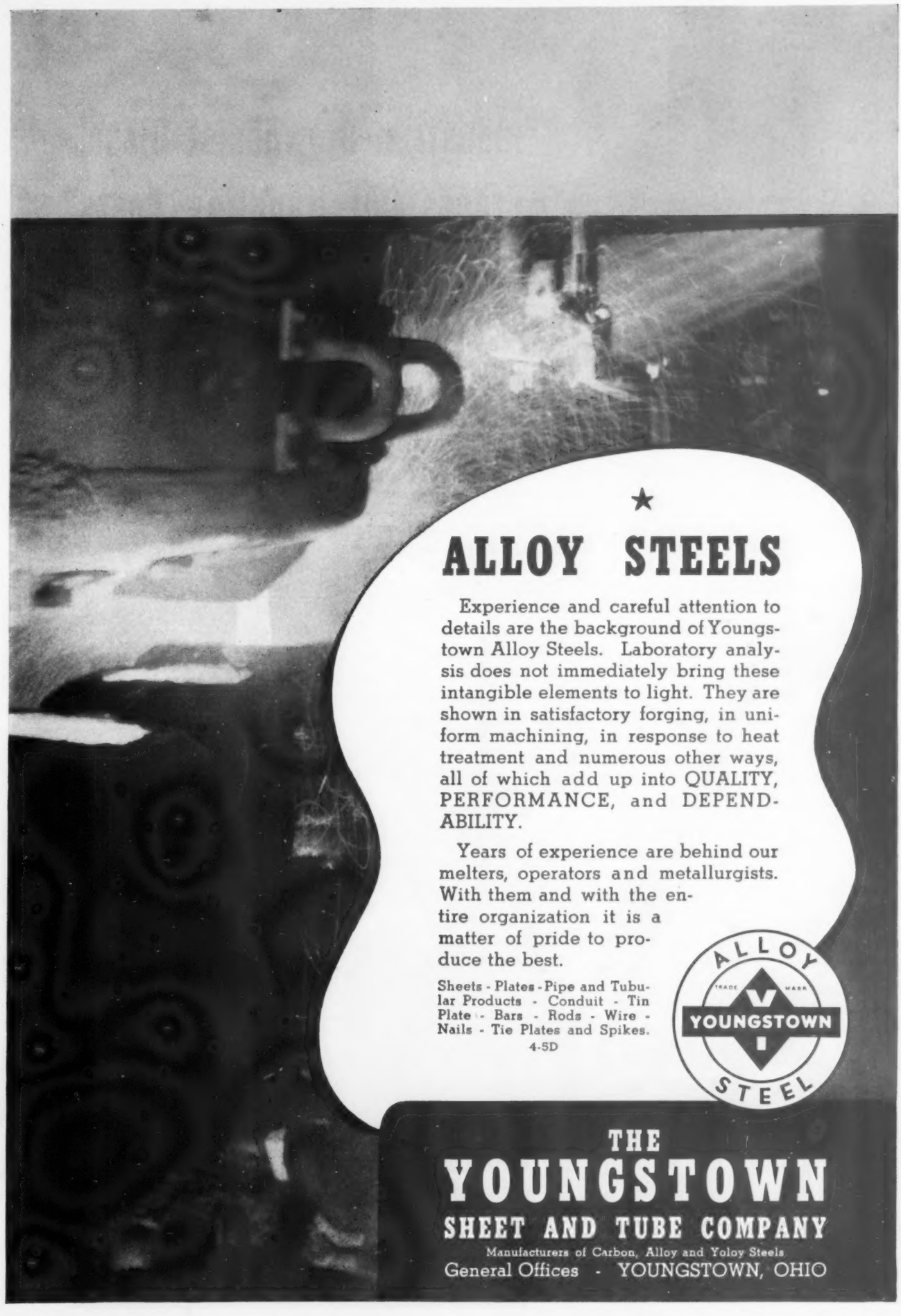
Note annealed rivets give slightly lower ultimate strength than those not annealed. However, experience and tests have shown annealed rivets give a more uniform value when driven cold. Too, they are not as subject to fiber damage or cracking, per items 11 and 12, Table I. In fact, they are strengthened by the proper amount of cold working during driving.

It also takes greater pressure to drive rivets not annealed. Cold working to the extent done in compression driving a cold rivet properly improves the steel in the same manner as cold drawing improves the strength of bars.

It is possible to design a joint to show an apparent greater strength when driven hot, due to shrinkage of the rivets in cooling. However, this apparent high strength can not be relied upon as it is only temporary, since the excessive tension induced in the rivet in cooling will quickly be relieved in service by normalizing action of live loads and vibration. With a cold-driven rivet, there is no tension beyond that allowable, and this tension is always maintained.

A large number of tests of compression-driven cold rivets in shear were made by the Pittsburgh Testing Laboratory. Brinell tests made on cross sections of cold-driven rivets indicate no difference in ten-

(*Please turn to Page* 99)



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The Houston Compress Company have been using a 25-ton Industrial Brownhoist Diesel crane for handling steel scrap from cars to boats for the last 3½ years. A recent check revealed that during an 81-hour period this crane's oil consumption was only 110 gallons at a total cost of $6.60 or less than 66 cents per 8-hour day!

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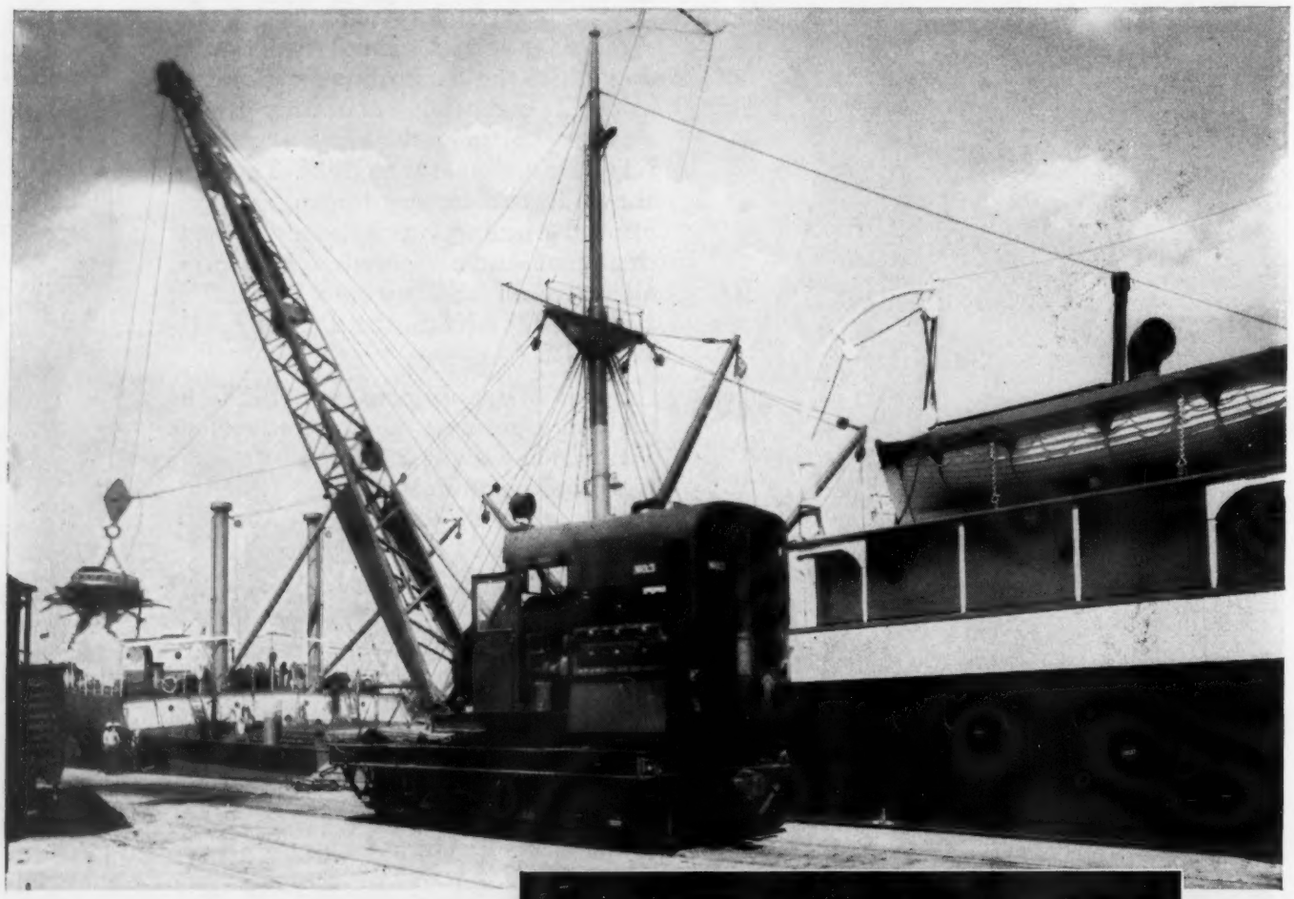
Lower fuel costs, greater output, longer life and greater "availability" are the four advantages you always get in an Industrial Brownhoist Diesel crane. *Investigate today how these cranes can help cut your handling costs.*



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BETWEEN HEATS WITH Shorty

■ Say Fellers:

Dropped over in the hot strip mill one day last week to see how the fellers were comin' with the installation of some new equipment we've been puttin' in. As I was struttin' 'cross the yard down past the open-hearth shop I caught up with a feller by the name of Doc Barren, one of the field men for the rollin' mill manufacturers doin' the job for us, 'n as we walked along chinin' with one another an airplane zoomed overhead.

"That guy sure's goin' places with 'is flying machine, Doc," I sez.

"Sure is," he responded. "But we're all flyin' pretty high right now, I reckon. 'N we'll probably be doin' it 'till Uncle Sam sez, 'Boys, we've gotta sweeten up the kitty so as to get more boats bobbin' up 'n down on the waves 'n so chip in an extra dime or so, will ya?' Yeh, we'll all be sayin' 'Uncle' some of these days when we step up to the ol' tax window."

Mills Going Good Pace

"Sure we will. But don't take 'er so hard, Doc. The mills are workin' like blue blazes . . ."

"That's what I'm sayin, Shorty. We're livin' in a cockeyed world 'n we've gotta 'gree that we've made 'er a clattering workshop. The busy wheels on the street 'n on the factory floor are turnin' with a deafening whirl 'n roar, 'n the rattle of the hammer in the shipyard 'n forge shop, 'n the tumult of the shriekin' steam and belchin' engines such as that one pushin' that drag of loaded chargin' boxes into the open-hearth buildin' over yonder—all confess that we're livin' in a busy beehive of activity."

"Mebbe it's a good thing for us, Doc. For instance, look what they're doin' 'cross the water. One of your men the other day was tellin' me 'bout the trouble he had settin' up a mill over in Scotland a few months ago. Nothin' to complain 'bout gettin' the bloomin' mill housin's off the boat but when it came to gettin' 'em from the dock to the plant site—well that was a different story. He told me the railroads weren't handy for doin' the trick cuz the housin's weighed 'round 60 tons. So they had to haul 'em from the wharf to the plant on auto trucks. 'N did they have fun! The trucks got stuck on some of the sharp turns 'n when they'd come to a good steep grade, they'd get up a ways 'n then chug to a stop. After huffin' 'n puffin' for many a day, they finally got those 60-ton babies restin' on their shoes and it wasn't many moons 'fore those Scotchmen were pullin' the whistle for heated slabs to feed into the rolls."

"Don't get me wrong, Shorty. I'm not pannin' the country we're livin' in. I'm jus' sayin' we've got steam up on all the boilers, we've got the throttle wide open at every steelmakin' plant, 'n thousands of men with their dinner pails tucked under their arms pass in and out of clock houses turn after turn. There's goin' to come a time when you fellers are goin' to pay more 'tention to maintenance. That's what I'm drivin' at."

"Fact of the matter is, Doc, we're givin' more thought to it right now than for many a day. Our maintenance gangs are on top of the job 'n so much so that we haven't had a breakdown of any consequence for months. Y' understand, I'm not tryin' to blow the trumpet; I'm jus' sayin' the fellers doin' maintenance work are 'on their toes."

Gets Under Skin

"Jus' reminds me. Our man who is settin' up your new mills—the same guy who told y' 'bout Scotchmen haulin' the blooming mill housin's over the hills—made a statement the other day that got me. He said that maintenance costs on a wide strip mill over there were runnin' somethin' like $2.50 a ton. Can't hardly believe it, but that's what he sez, 'n he ought to know what he's talkin' 'bout for he was on the job long enough 'cross the water."

"Boy, if we had maintenance costs like that on our mill, the Boss would be on our necks like a ton of brick. 'N I don't mean mebbe. Why, say—when the Boss gets the cost sheet each month and sees the maintenance cost on the big strip mill hittin' over 30 cents a ton, he's on the phone 'fore y' know it, wantin' to know what's the matter. But $2.50 for maintenance. There must be somethin' wrong, Doc. There's a screw loose somewhere."

"No, Shorty, the figger of $2.50 is okay. Y' see, it's not a question of machines over there; it's a question of men. For instance, when it comes to changin' an oil fittin' on one of the hot mill stands, it takes three men to do the job."

Tell 'er to the Boss

"Say, Doc. 'Fore you go out the gate this afternoon, stop in the Boss' office and ask 'im how he'd like to cast 'is peepers on that figger at the end of the month, will ya?"

"Sure as I'd do that, Shorty, he'd think you guys with a figger of 30 cents should be sunin' yourselves down in Florida. Naw, can't think of it. Tell 'im yourself. But I also understand that the mill 'cross the pond only works a couple of turns out of 24 hours cuz of bombs from Heinie's airplanes. They used to shut the mill down every time they thought the fireworks would start 'n it would take 'em three hours to get the steel into the rolls when it came time to start up again. So they decided to fool Heinie's high flyers, 'n now the mill works up 'till midnight 'n then goes down until 7 a. m."

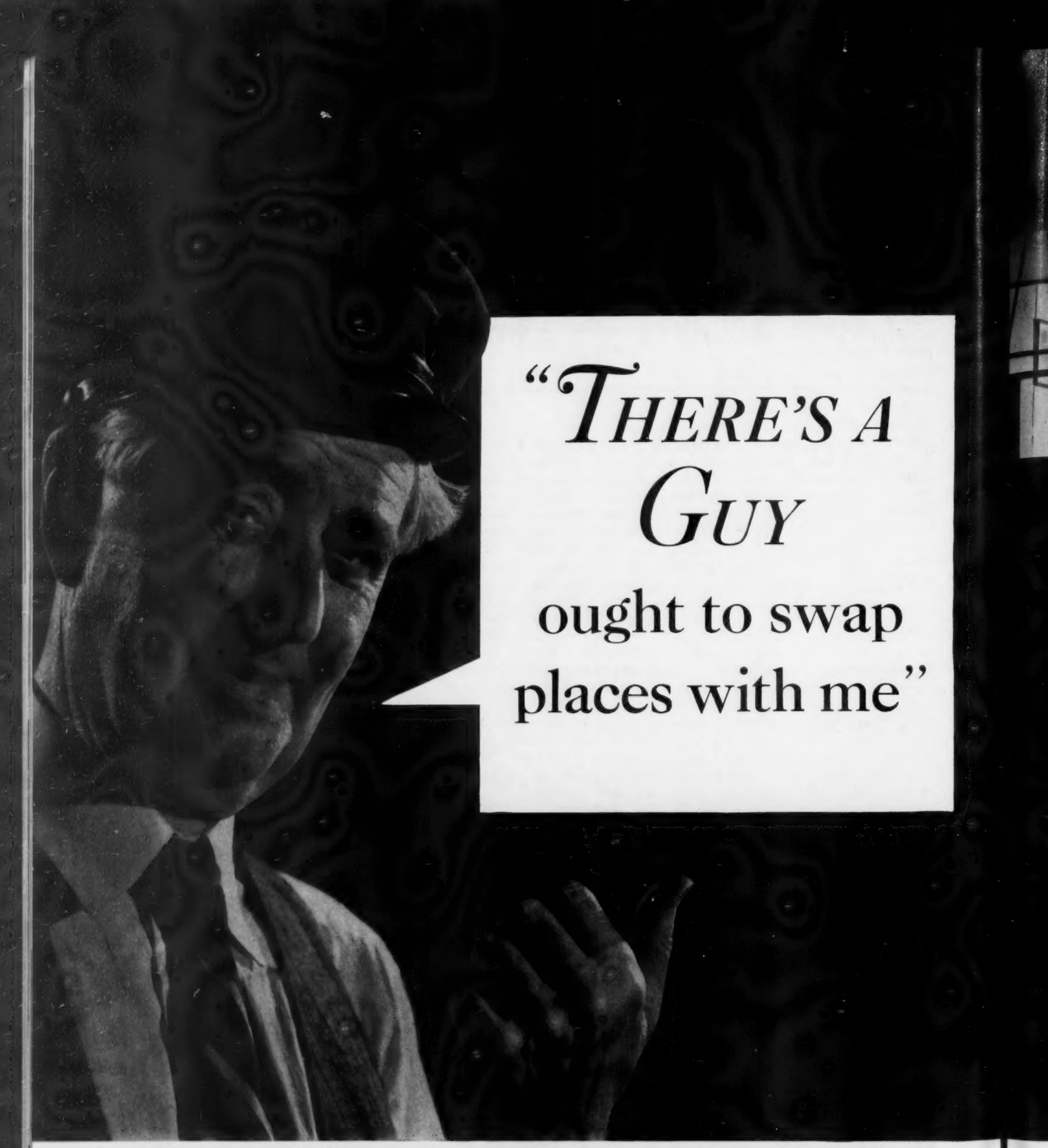
"Not a bad idea, Doc. Tell that to the boss on your way out along with the maintenance figger, willya? Mebbe he'll give us a turn off."

* * *

Jus' thought you'd like to get in on some of the conversation that's passed out in the yards of steel mills these days. 'Course, there's lots more but I'll be tellin' y' 'bout it later.

So long, fellers. I'll be seein' ya.

"Shorty" Long



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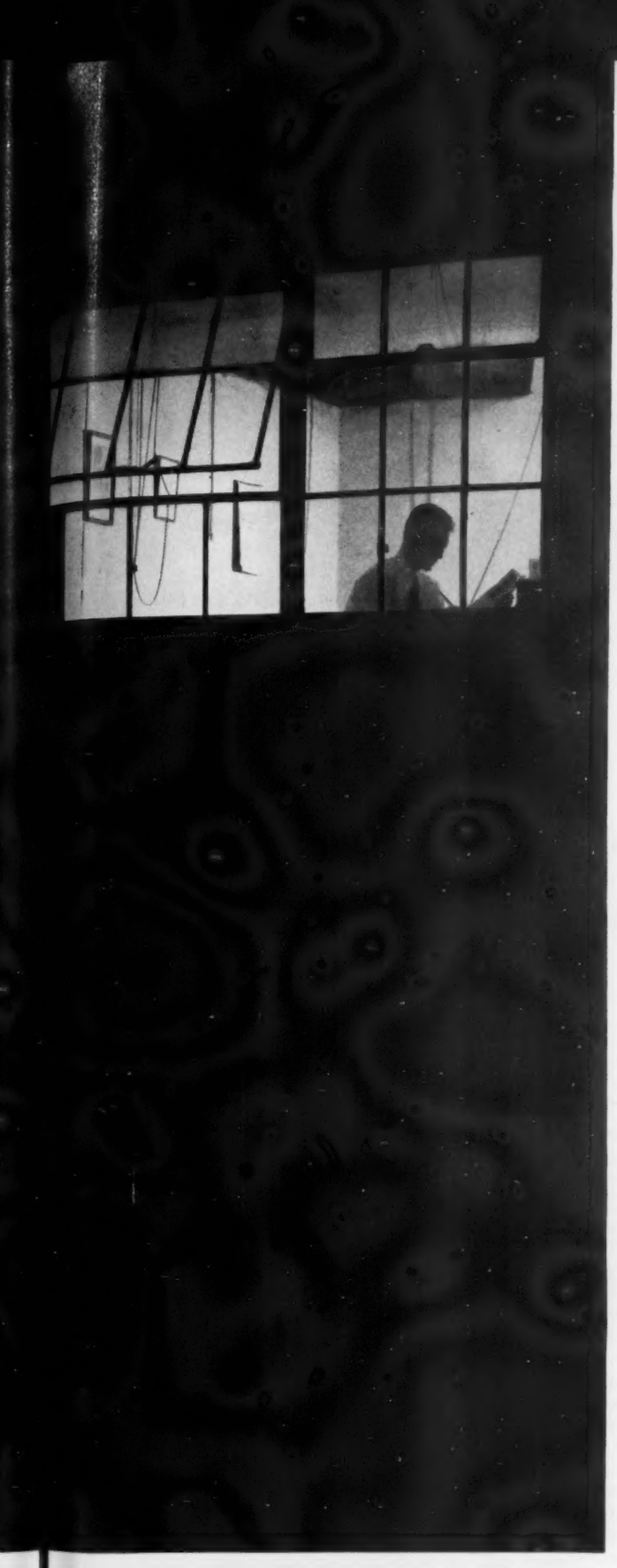

"THE BOSS CERTAINLY MAKES IT TOUGH FOR HIMSELF TRYING TO DO A TWO-MAN JOB ALONE"

THERE promises to be a lot of midnight oil burned in the next few months. The pressure is definitely on. Much of this overtime work probably can't be avoided. But, whenever your production problems involve the use of steel, we believe we can help you turn those office lights out just a little earlier.

As a step in this direction we offer you more efficient steels—U·S·S Controlled Steels. In these plain carbon steels, fine or coarse grain, forging and machining properties, response to heat treatment, ductility, etc., are maintained uniformly in shipment after shipment. Thus your tool set-ups, heat treating and forging procedures, once established, require minimum change. Fabrication headaches can be reduced, production schedules maintained more uniformly. That's one way to avoid having to keep nightwatchman hours.

To help you use these steels most efficiently, we have available a corps of industrial "trouble shooters," steel engineers and metallurgists who will work shoulder to shoulder with you in adapting these steels to your special requirements with the least trouble, waste and delay.

Behind them are the facilities of the most completely equipped steel research laboratories and the finest and largest steel making plants in America. If you are being asked to speed up your production or are anxiously studying new and unfamiliar blue prints, give us a chance to help you. We welcome the opportunity.

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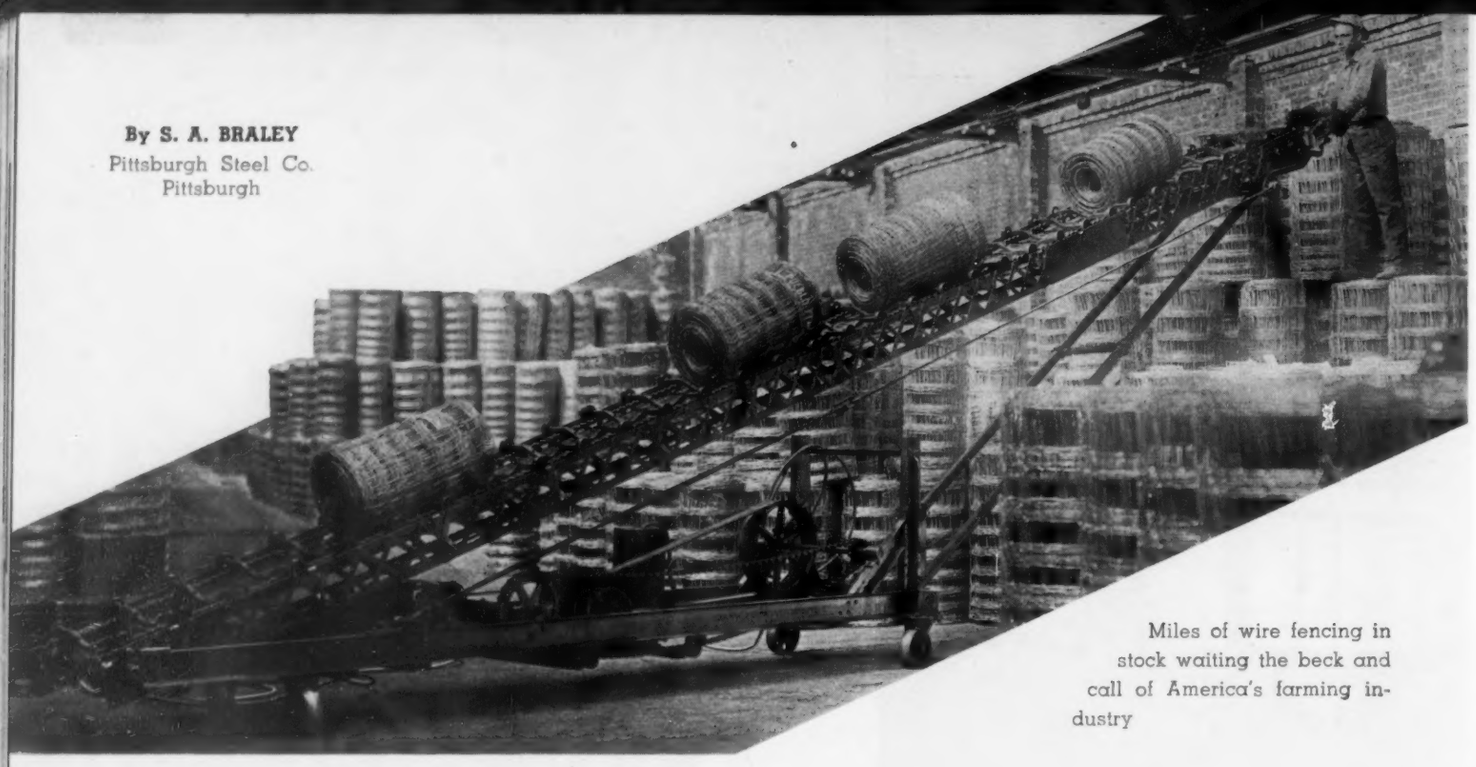


Miles of wire fencing in stock waiting the beck and call of America's farming industry

Purchase of Fencing On Specification

Quality of galvanized coating on fence wire is determined by such factors as adherence, uniformity, thickness and appearance. The importance of these factors as well as some of the things that should be considered in buying galvanized fencing are cited in the accompanying treatise

■ CONSIDERABLE work has been done on the effect of analysis of wire on galvanized quality, and it has been found that under the same conditions of galvanizing that the base metal is all important. The base metal should also have in itself a maximum of corrosion resistance. It has been demonstrated that the presence of copper in steel in specified amounts of 0.20 to 0.30 per cent regularly known as "copper-bearing steel" adds materially to the corrosion resistance of steel. The quality of galvanizing is determined by three factors: namely, adherence, uniformity and thickness or quantity, and a fourth may be added, which is appearance.

Cites Important Property

Let us now consider the basis of these factors. Adherence is important because if the adherence is not good any deformation of the material causes a cracking or peeling of the zinc, and thus exposure of the base metal and complete loss of the value of the zinc. This is particularly important in a wrapped or twisted wire fence; the protection of the zinc is no better than the protection at the point of twist or wrap. Other factors contributory to adherence of coating may be the quality of the zinc used and the amount applied. The more pure the zinc, the greater its ductility and hence the less its possibility of cracking. However, the greater the thickness, the greater the possibility of cracking, regardless of the zinc quality.

This, then, is a factor to be noted in purchase of fence, especially hinge joint or wrapped fence. Does the zinc peel at the wraps?

The other important property of a fence is the amount of zinc uniformly distributed on the wire. During the past several years some extensive tests have been conducted by the American Society of Testing Materials, and in a report of the committee in June, 1939, the following facts have been recorded.

On page 86 and 87 a table lists three separate groups of galvanized wires and the results of atmospheric corrosion on them as taken at three different locations, namely, Pittsburgh, Sandy Hook and State College, Pa.

A check of inspection tests on these sample results in the following average values:

Group	Ounces of zinc per sq. ft.	Preece test, minutes immersed
I	0.813	5
II	0.85	7
III	0.81	4-2/3

Note is made that samples in each group have the same base metal composition and coating characteristics. Perusal of the photographs definitely characterize the three groups as three different methods of galvanizing.

However, the three groups show loss of zinc by atmospheric corrosion as follows:

GROUP I	GROUP II	GROUP III
Pittsburgh, 1.48 grs.		
0.3993/sq. ft./gr.	0.372	0 380
Pittsburgh, 1.94 grs.		
0.372	0.362	0.344
Sandy Hook, 1.44 grs.		
0.122	0.139	0.118
State College, Pa., 1.3 grs.		
0.071	0.080	0.067

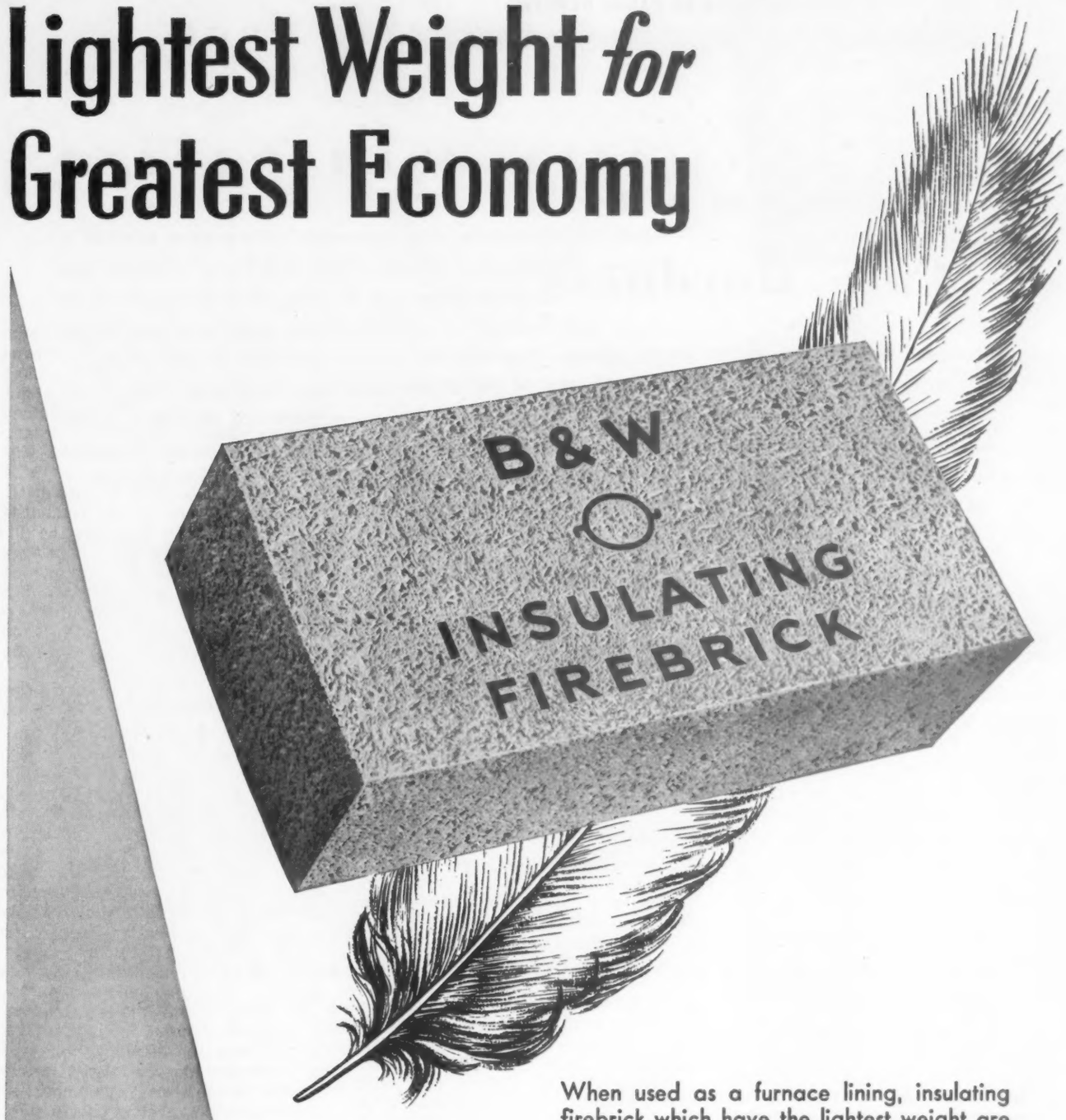
The first noticeable characteristic of these data is the difference in loss at the various locations. The first, Pittsburgh, is an industrial area and these samples are exposed in one of the worst areas. The second is at Sandy Hook, where the samples are exposed to coastal salt water atmospheres, whereas the third are at State College, Pa., a farming area.

The second noticeable feature is that the rate of loss of zinc at the

(*Please turn to Page* 103)

Abstract of a paper presented at the semiannual meeting of the American Society of Agricultural Engineers, Chicago, Dec. 2-6.

Lightest Weight *for* Greatest Economy



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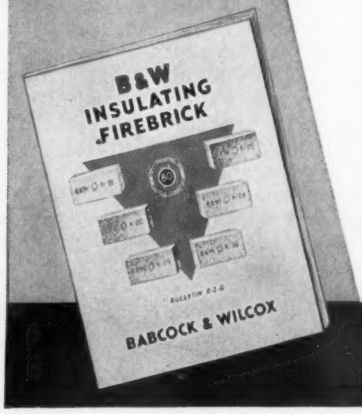

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The Effect of .....

Nitrogen on Case Hardness

For such items as automotive gears where extremely high surface hardness is desirable to prevent loss of dimension through wear, a carbon-chromium steel is found to be superior to nickel-chromium steel as far as maximum case hardness is concerned. Nitrogen appears to inhibit softening of the case on drawing in 300 to 600-degree Fahr. range

■ AN INVESTIGATION was made to show the effects of nitrogen on the case hardness of nickel-chromium and carbon-chromium steel of medium carbon content after treatment in various commercial liquid case-hardening baths followed by oil quenching and drawing. The type of bath, of course, determined the amount of nitrogen introduced into the case.

Since the material to be case hardened was used for automotive transmission gears, the case hardness in the first 0.005-inch was the most important because in modern rigidly mounted transmissions, wear of a few thousandths of an inch will affect the performance adversely.

In the tests, steel flats and steel in the form of 1.5-inch rounds was treated for the purpose of machining off successive layers from the carburized surface to determine the carbon and nitrogen gradation through the case. The carbon-chromium steel specimens contained 0.47 per cent carbon, 0.80 per cent manganese and 1.0 per cent chromium. The nickel-chromium steel samples contained 0.415 per cent carbon, 0.75 per cent manganese, 1.3 per cent nickel, 0.71 per cent chromium.

To obtain a comparison of the effect of nitrogen on case hardness, baths were used which introduced considerable quantities of nitrogen besides carbon. These baths included an activated-type bath, a straight 33 per cent sodium cyanide bath and a calcium cyanamid bath. Baths that introduced negligible nitrogen included a straight carburizing-type bath and a solid carburizer composed of 71 per cent hardwood charcoal, 10 per cent barium carbonate, 5 per cent calcium carbonate, 2 per cent sodium carbonate and 12 per cent oil of SAE No. 20 grade.

Large diameter rounds were held in the baths for period of 10, 30 and 120 minutes at temperature of 1470 degrees Fahr. for the carbon-chromium steel and 1500 degrees Fahr. for the nickel-chromium steel. Samples were cooled slowly in lime, and the carbon and nitrogen content determined at various depths by removal of successive layers from the radius of the bars and analyzing the chips.

Results showed generally a high value of nitrogen in the first 0.004-inch below the surface. Likewise there is a definite tendency for a higher concentration of carbon in the surface cut. Of course one of the reasons for the relatively slow diffusion of these elements was the comparatively low temperatures employed. Metallographic examination of samples showed the nickel-chromium samples to have a consistently coarse grained case and core structure as contrasted with the fine grain structures developed by the carbon-chromium samples. This is accounted for by grain size tests which showed the nickel-chromium steel to be inherently coarse grained and the carbon-chromium steel to be a fine grained type. The fact that the nickel-chromium steel showed a coarse grain even at 1500 degrees Fahr. indicates it must have been an extremely coarse grained type.

All the case microstructures obtained on the nickel-chromium steels showed the formation of martensite with some retained austenite, the latter being consistently more abundant in occurrence than the coarse grained case structures of the nickel-chromium steel. Only a very slight amount of austenite was retained in the sodium cyanide treated samples. A thin cementite skin was formed on all samples except those treated in the sodium cyanide bath.

The occurrence of the cementite skin at the surface indicates the diffusion of carbon from the surface into the core was quite slow, which is in accordance with the fact that low carburizing temperatures result in a concentration of carbon at the surface due to a low diffusion rate.

Carbon Checks Incomplete

Theoretical carbon content of pure cementite is 6.67 per cent. In several instances nearly solid carbide surfaces were noted on the samples, indicating actual surface carbon content from 4.5 to 6 per cent. Carbon checks run on successive cuts taken from the surface of large diameter rounds give an incomplete picture of carbon diffusion and only indicate in a qualitative manner the relative degree of carbon penetration. A similar condition exists as regards nitrogen penetration.

Hardness data was obtained on a 3-degree tapered round surface and showed the effects of nitrogen to a greater degree than flat surface hardness tests. A comparison of hardness penetration curves starting from the maximum developed case hardness showed that temperatures at least 100 degrees Fahr. higher would be necessary to obtain comparable hardness values in the high-nitrogen case as compared with the solid carburized case. The effect of the high nitrogen introduced by the sodium cyanide treatment is to produce a substantially higher hardness level at the various draw temperatures.

When drawn between 300 and 500 degrees Fahr., there is a definitely higher hardness level for the high nitrogen case between the point of maximum case hardness and the core. Low nitrogen baths produced a case having a substantially higher carbon content than the sodium

(*Please turn to Page* 102)

From a paper by S. W. Poole, metallurgical assistant, Republic Steel Corp., Central Alloy District, Canton, O., presented at the twenty-second annual convention of the American Society for Metals, Cleveland.

DON'T OVERLOOK

The Possibilities in

BETTER PACKAGING

A definite program of laboratory tests, transportation tests and assembly experience in one plant emphasizes the importance of constant progress in packaging methods. Here is told how one plant saves $86,400 yearly, reduces field damages greatly and simplifies crating and uncrating operations. The methods employed have wide range of possible application and are not patented or otherwise restricted. Perhaps a study of your packaging methods in the light of new materials and systems might produce similar results for you

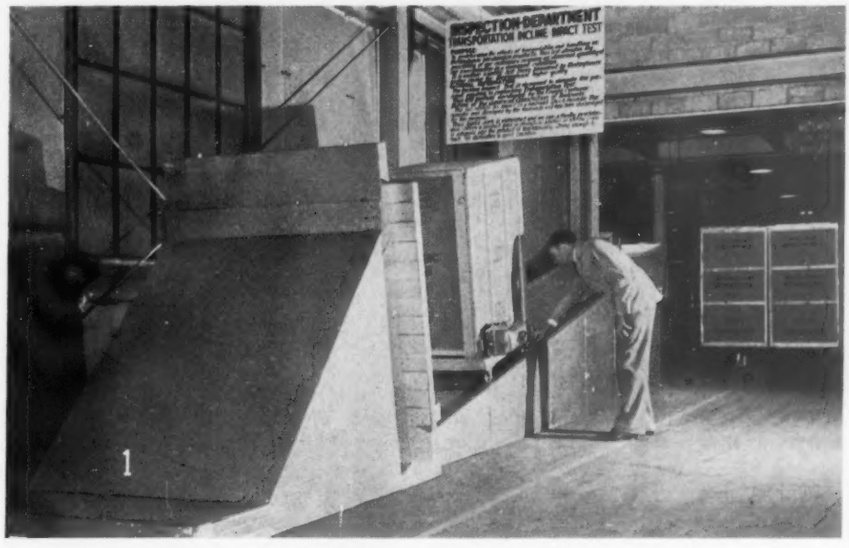


Fig. 1—This is view of the standard "incline-impact" test developed by the Freight Container Bureau of the American Association of Railroads. It records the impact produced by letting the package roll down an incline against a standard railroad shock recorder. This setup makes it possible to predetermine accurately whether or not a crate and the product it contains are mechanically strong enough to reach their destination in good condition

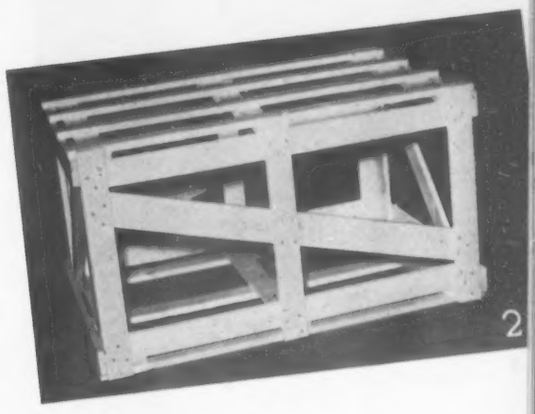


Fig. 2—Used from 1914 to 1931 was this first heavy crate made from boards 1 x 2 inches and 1 x 3 inches

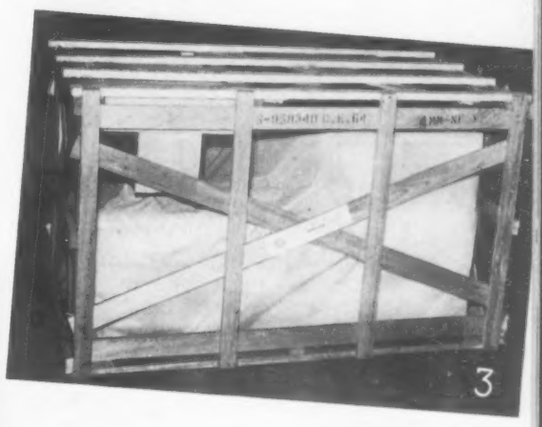


Fig. 3—The first advance was made in 1931 and this crate was used till 1935. It introduced a second diagonal, permitting a 15 per cent reduction in lumber required by using boards 1 x 2 inches and 3/8 x 2 3/8 instead of the heavier boards in the original crate, Fig. 2. The range was bolted to the bottom of the crate

Fig. 4—This was the first crate with the fiberboard enclosures. It was introduced in 1935. This kept the product clean and bright and was a distinct improvement in quality of the package compared with previous crates employing a paper wrapping for the product. Range still was bolted to floor of crate

■ PACKAGING methods are just as important as any other manufacturing function. Every manufacturer, however, has his own ideas on the importance and proper method of packing. Many spend large sums of money to perfect the product but pay little or no attention to crating it. They do not appear to realize that no matter how high the quality of a product may be, it is all wasted if the packing is faulty and the product becomes damaged during shipment.

By RALPH F. BISBEE
Supervisor of Quality Control
Merchandising Division
Westinghouse Electric & Mfg. Co.
Mansfield, O.

Constant emphasis on packaging of Westinghouse electric ranges has been found to introduce not only valuable savings but has lowered damages, bettered packing and unpacking operations. Like any other manufacturing function, it is imperative that constant progress be made in packaging methods if the full possibilities therein are to be attained. The selling price of the product must be kept competitive,

Fig. 6—This is the full floating packing used for medium size ranges. Wooden supports provide the inside bracing

and at the same time field losses must be held to a minimum.

Progress in crate design, however, works both ways. For example, we found in one of our studies that by adding $0.41 to improve the crate, we could make a reduction of more than $1.00 in the range design. This meant an over-all cost reduction of over $0.59 per range.

This sort of thing does not mean a cheaper or inferior product by any means. In many instances it was found that the product had extra gussets and braces not needed for service to the consumer but employed merely to stiffen the product during shipment and to supplement the support furnished by the crate in which the product was shipped.

In studying packaging, we keep three objectives in mind at all times.

Field losses must be kept at a minimum. These losses are expensive and are certain to create ill will and a poor reputation. Therefore the crate design must be adequate to carry the product to its destination without injury to the range. At one time chippage on ranges in the field was as high as 35 per cent in long hauls—to the west coast, for example. Several years ago this was reduced to 18 per cent. In 1940 it was only 1 per cent. This shows that it is possible to make real progress in packaging.

Secondly, the container must be economical. Usually it is thrown away, especially if it goes to a private home. So the manufacturer must absorb the crating cost in his selling price.

Finally, it must be a simple job to crate and uncrate the product. Crating is largely a manual function because of the many different shapes and sizes in normal manufacturing. With high wages, it is imperative that packaging involve only simple, easy operations. Uncrating must be just as simple or the product may be harmed when the consumer loses his temper, or in his eagerness tries to shortcut the proper method of opening the package. Westinghouse prints on all its crates a set of directions for the proper method of opening the package.

There is one other thing which must be kept in mind, and that is the various types of warehouses in which the products may be stored as well as the handling methods and equipment found there. Some warehouses have cranes, some may be used to store five or six competitive products, and some are certain to have careless employes. The crate must protect the product from possible abuse from each of these sources.

Package design at Westinghouse proceeds somewhat along these lines: The packing engineer is notified by the product engineers of any new appliance or any change in design of a product. He contacts the sales and advertising departments to see what they want printed on the package. Next he orders designs and drawings, and prepares inside packing. He checks with the packing laboratory, the cost department, and other groups. Weight, size and shape of the new product are major factors in determining whether it will be shipped in a crate or in a carton. Pad manufacturers have been able to offer many helpful suggestions.

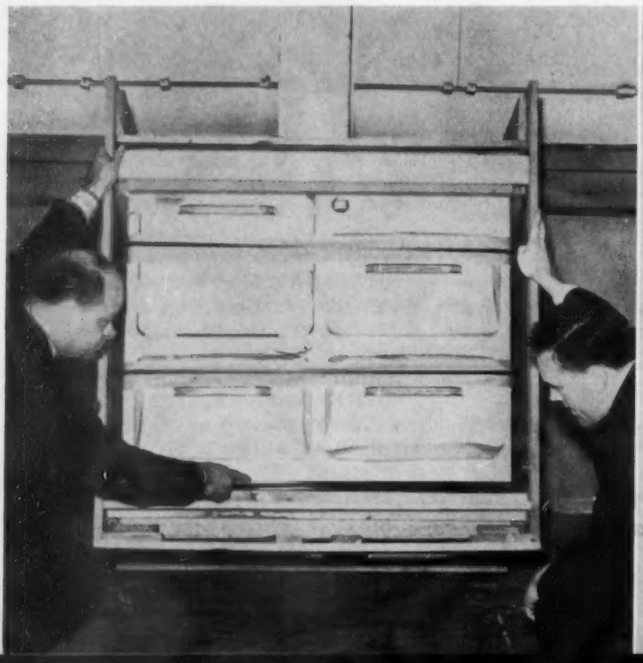
Tests Tell the Story: When a new packaging material or design is under consideration, an outside laboratory with special equipment is engaged to run comparative tests for us. If their report shows the new material or design is better for the purpose than the present crate or carton, we run a series of our own tests with products in the containers. Then we run a test shipment.

In making changes, it is necessary to prove out major revisions before jumping at conclusions which might create field trouble. For several years we used what we called a "hand transportation" test. The range in its crate was lifted

(*Please turn to Page* 101)

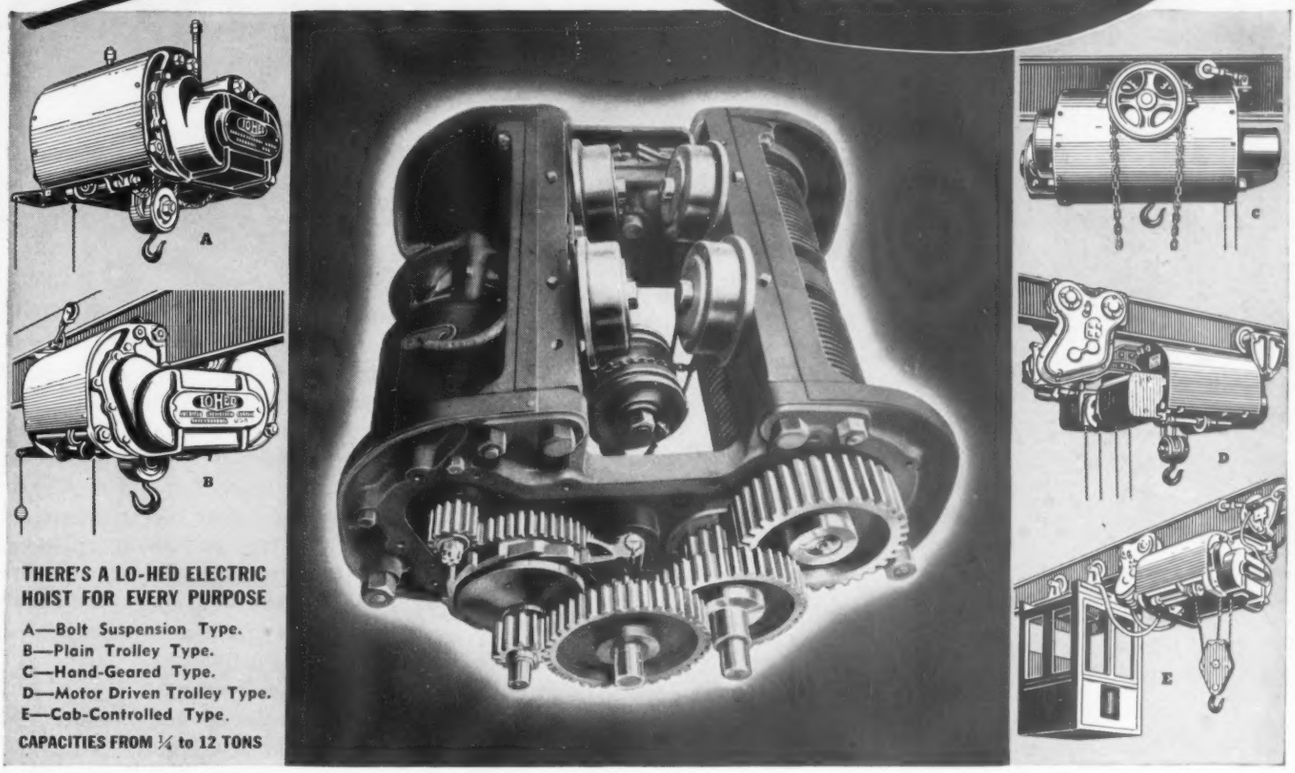
Fig. 5—Next advance was "floating" the product by means of pads of corrugated paper. Shown at left here is the first method of providing a full floating package as introduced in 1936. Wooden supports are used all around range at top and at bottom to hold the pads of corrugated paper in position, also to hold pads against range top

Fig. 7—This full floating design, right, for small ranges uses no interior wood bracing as interlocking corrugated board frame at top is employed to float the range with another special design of pad for the bottom as shown



Good Hoists

A-E-CO
LO-HED
Time-tested
HOISTS



THERE'S A LO-HED ELECTRIC HOIST FOR EVERY PURPOSE

A—Bolt Suspension Type.
B—Plain Trolley Type.
C—Hand-Geared Type.
D—Motor Driven Trolley Type.
E—Cab-Controlled Type.

CAPACITIES FROM ¼ to 12 TONS

GOOD FOR ALL PURPOSES

If you called the Lo-Hed Hoist the low headroom hoist your description would be right but not complete. Possibly 10% have bought a Lo-Hed because it is the original low headroom hoist, the other 90%—numbering thousands of customers and hoists—because the Lo-Hed is a hoist good for *all* purposes. It's easy to service, operates on any track, is noted for exceptionally low maintenance, is protected against dust, moisture, is fast, safe and fool-proof, and is furnished in a wide range of types and sizes for applications in any industry you can name.

You can see for yourself from the open-view on this page that the Lo-Hed Hoist has every worthwhile feature a good all-purpose hoist needs. Look at these time-tested features: Heavy duty hoist type motor, automatic lowering brake, anti-friction bearings, stub tooth spur gears, plow-steel cable, 100% positive automatic upper limit stop, dust and moisture-proof controller. (Construction varies slightly for classes of Lo-Heds.) Investigate Lo-Hed time-tested construction. Write today for the complete, well illustrated Lo-Hed Catalog shown below.

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City_____ State_____
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Were Eli Whitney Alive

He and His Key Men Would Be

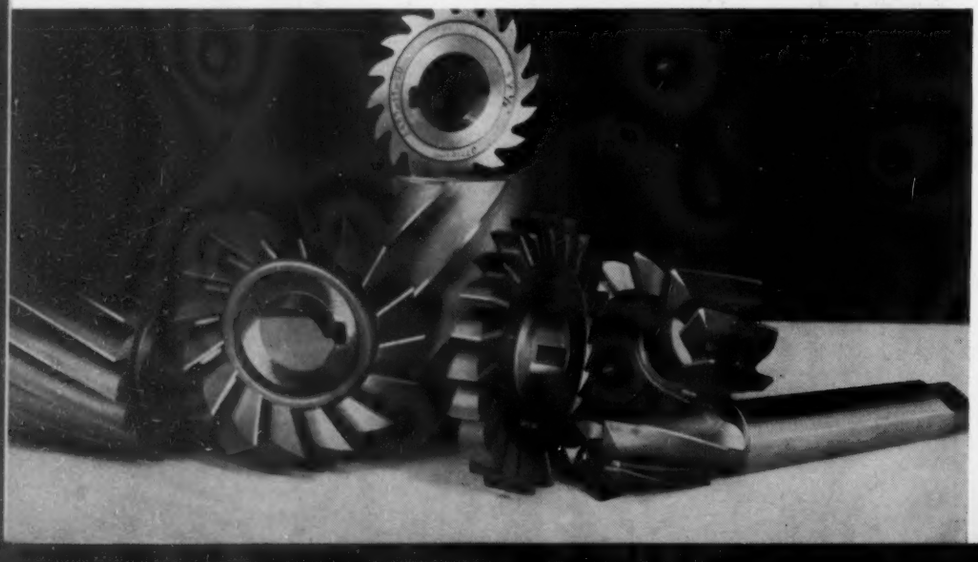
ASTE Machine Tool and Progress Exhibition and meeting at Detroit, March 25-29 inclusive, represents to the production specialists of America at this critical time in our industrial history exactly what a top-flight clinic would mean to a staff of surgeons faced with an operation of unprecedented difficulty. At this ASTE "clinic" your tool engineers and their associates—faced with unprecedented national defense production operations—will be given practical, intensive coaching by masters of their profession, in every "last word" in methods, materials and instruments for speeding up and improving the American system of manufacturing, upon which the success of our whole defense program depends

■ IN GERMANY these days they are wasting nothing. Every bit of material, every machine, every ounce of power, the mental and physical efforts of every man and woman, and—above all that—every minute of time, all is being massed in a huge government directed and controlled effort, the like of which has never before been seen in this world.

And yet, in the face of all that, the famous Leipsic industrial exposition has just been held as usual, and key people from industries throughout greater Germany were there. Make no mistake about it, they didn't *just go*. They were *sent* by the authorities. They weren't sent by the authorities on any holiday trip, either. There was a terrible purposefulness behind it all. The latest developments in machines, tools and materials were exhibited at Leipsic. Production and tooling specialists from all over Germany and German-controlled industrial countries were sent there for one and only one reason. That reason was that this exhibition at this critical time was a tremendous, highly intensified educational influence in the interests of mass production in Germany as the basic factor toward world dominance.

Still—in the face of this example set by what admittedly is one of the most efficient industrial nations of the world—there are those in America who may question the advisability of an industrial exposition in our country at this time, and who may question even more sharply the advisability of sending any of their men to it, or even of allowing them time off to go "on their own."

Strange to say, these may be in many cases the very same industrialists who are crying the loudest for some kind of intensive "emergency" training within industry and for more up-to-date understanding on the part of the older people within their organization, of modern methods for coping with modern production problems—especially the novel and tough ones now presented by national defense.



As far as tooling and production methods are concerned, America never has had to bow in tribute to any other country, although there recently have been times—and this may be one of them—when certain European nations were "right on our coattails", in certain respects at least.

That goes also for national expositions having to do with tooling and production. Some of the European expositions date back much further than ours, but the fact that

Today

BE THERE

By GUY HUBBARD
Machine Tool Editor

ever since the end of the first World war, European engineers—including those from Germany and Japan — have been flocking to American machinery and tool shows with insatiable brief cases, notebooks, sketch pads and candid cameras, speaks for itself.

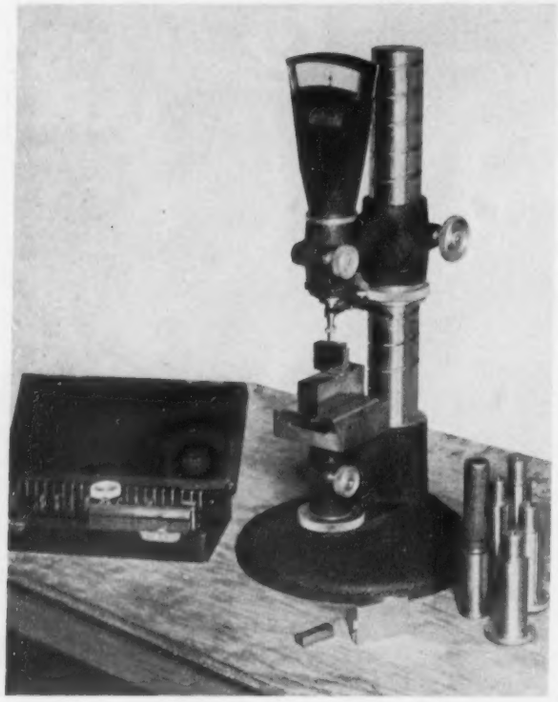
Having thus generously poured out our knowledge of—and genius in—tooling and production technique to the world in general and having seen certain parts of the world take advantage of it in ways which now bring us face to face with a crisis in world history, is it not high time that American industry took full advantage of one of its own famous "industrial clinics" in keying itself up to meet this challenge?

It should be a matter of pride to Americans to know that for two years a large number of our leading tooling engineers and production specialists have given generously of their time and talents in the planning of a national Machine and Tool Progress Exhibition to be held at Detroit, March 25-29, 1941, in conjunction with a national technical meeting of the American Society of Tool Engineers. It should be a matter of pride that industry has backed this project to the hilt by buying up every square foot of available space in Detroit's exhibition hall, in order to show those things which will help the tool engineering and production men to boost output and improve quality.

It should be a very special matter of pride that these tool engineers had the courage to go right ahead with this big project, despite the outbreak of the war, so that now—at a time when knowledge available at this exposition and meeting will be of inestimable value to industry in connection with the national defense production program—the project is about to become a reality.

With the recent example of Leipsic so fresh before us, it would indeed be a sorry blow to the American defense program, if American industry should not take advantage of the more than comparable possibilities of this Detroit "clinic". It will be a sad commentary on the range of vision of American manufacturing executives if they fail to see to it that key men attend—even though they do have to travel further than the distances from Posen or Konigsberg to Leipsic.

Several people have remarked to me: "What's the use of looking at new equipment these days—you can't buy it without priority ratings and even then you can't get deliveries!" There may be some truth in the first part of that statement, but it won't effect many who will attend this Detroit affair. Most of those already are involved in manufacturing defense material and lots more are going to be—even though they may not realize it at the moment. The last part of that statement quoted at the beginning of this paragraph is not true at all. This Detroit affair is not primarily a machine tool show—although there will be a goodly number of highly significant modern machine tools in evidence. Primarily it is an exhibition of those things which will make all kinds of machine tools—both old and new—much more highly and effectively productive.



Deliveries on such items are nowhere near as bad as they are on machine tools. In many cases they will make immediately possible tremendous increases in efficiency on the machine tools which you now have —thus making it possible to carry on very effectively while awaiting deliveries of new machines now on order. There likewise will be demonstrated hundreds of tools, gages, instruments, etc., which will make your skilled men increasingly effective at a time when skilled men are even harder to get than new machine tools. Also, hundreds of things which will make much more quickly useful on production and inspection work the hordes of unskilled now pouring into industry. Regardless of the status of your company as far as deliveries and priorities are concerned, there is something else to be gained by attending the ASTE show and meetings at Detroit. It is something intangible, but of importance greater perhaps than anything else—and it costs nothing except the time and expense involved in attending and the wear and tear on shoes, eyes, ears and brain in really "getting around" and "taking everything in." The thing I am talking about is—a brand new, up-to-the-minute set of ideas on tool engineering technique! Let me cite just one example of how this idea-collecting business can work out. Several months after the second ASTE exhibition, which was held in the spring of 1939, I was shown a home-made precision machine for spacing and boring holes in a part upon which the entire accuracy and practical functioning of a certain machine built for the trade depends. "We," said my informant, "got that thing up right here in our own shop and it is worth thousands of dollars to us."

I don't know just who he meant by "we", but I do know that one of his competent tool engineers—at his own personal expense—had attended the 1939 ASTE show. Furthermore, I know that it was there that he became acquainted with the basic idea of this "home-made" device, and that there also he became acquainted with instruments and certain other elements purchased outside, which had been built into this "home-made" apparatus.

Let us hope that that same tool engineer, and several thousands of others like him, not only will be allowed to attend this 1941 show, but also will be furnished the where-withal to do so. Right now we could use a lot more "home-made" production equipment of that kind. All that typical American tool engineers need is just the sort of inspiration that attendance at this Detroit "clinic" will give, in order to set their brains clicking overtime in creative thinking along just such original lines.

Eli Whitney, father of the interchangeable, or *American* system, of manufacturing had no such opportunities as that. He did, however, take eager advantage of such meager sources of inspiration as there were in those days—including Thomas Jefferson's personal knowledge of rudimentary French attempts at interchangeable manufacturing of muskets. Thrifty Yankee though he was, you can be sure that Eli Whitney—were he living today—would be at the forthcoming Detroit tool engineering clinic. Not only that, he would have with him a number of his key associates at the famous Whitneyville armory. Don't ignor an opportunity of which Eli Whitney would have taken eager advantage, and on which others right in your own line of business certainly are going to benefit heavily—whether you do or not!

Mirrors of Motordom

(*Concluded from Page* 38)

$130.76 to maintain its standard of living, leaving a balance of $26.73, just about the right amount to meet monthly payments on a new car, or a good used car.

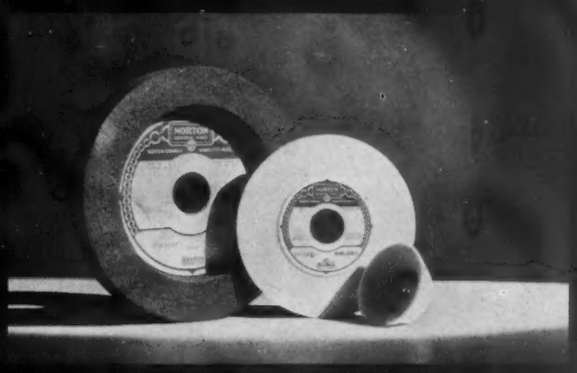
In six months, however, this $26.73 will have to be diverted to defense taxes, higher rents and other exigencies, leaving little for the finance company unless wages keep stepping ahead of living costs and mounting taxes.

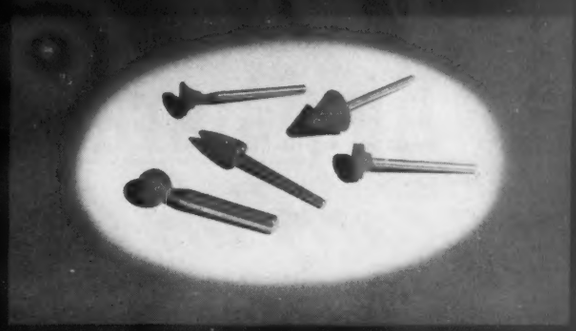
Thrift, More Taxes, More Output Seen Inflation Bars

Thirty-second annual report of General Motors Corp. sounds a solemn warning against the ravages of inflation which usually result from the sudden dumping of billions of dollars of credit into the nation's economy. Suggested controls are: Prevention of credit excesses by encouraging thrift and saving; increasing tax yield through increasing productive output of the nation; prevention of abnormal increases in wages; and regulation of consumer purchasing power in relation to the available supply of consumer goods, the latter accomplished by special excise taxes.

Net sales of GM for 1940 totaled $1,794,936,642, a 30 per cent increase over 1939 and the highest in the history of the present corporation which dates back to 1917. Net income available for dividends, however, was about on a par with 1937. Payrolls were the highest for any year in the corporation's history, and number of employes second only to 1937, being just short of a quarter of a million.

TOOL ENGINEERS





. . . . Let Norton Share Your Grinding Worries

THERE'S no time now in the tool engineer's day for details such as tool sharpening. But near you there is a Norton engineer ready to tackle the grinding jobs.

High Speed Steel Tools —

For grinding high speed tool steels and similar alloys the Norton engineer will recommend the special "B-E" bond and one of the Norton fused alumina abrasives—Alundum, 19 Alundum, 38 Alundum or 57 Alundum. Grain, grade and structure selection will depend on the details of each job.

Cemented Carbide Tools —

For off-hand grinding of single point cemented carbide tools he will recommend the Norton developed metal bonded diamond wheel—strong, heat-resistant and extremely long lived. For tool and cutter grinding of multi-blade carbide tools it will be the fast cutting resinoid bonded diamond wheel.

Stock Cutting and Tool Salvage —

Cutting stock for making tools and dies, cutting broken tools for repointing, cutting chip breakers—if fast cutting action and long wheel life are most important he'll specify a resinoid wheel. But if a soft, free grinding action and minimum discoloration are essential it will probably be shellac bond.

Die Finishing —

For the countless finishing jobs on dies, molds and tools he has nearly 200 standard sizes and shapes in the Norton line to select from—fast cutting 38 Alundum wheels and points with spindles of stainless steel.

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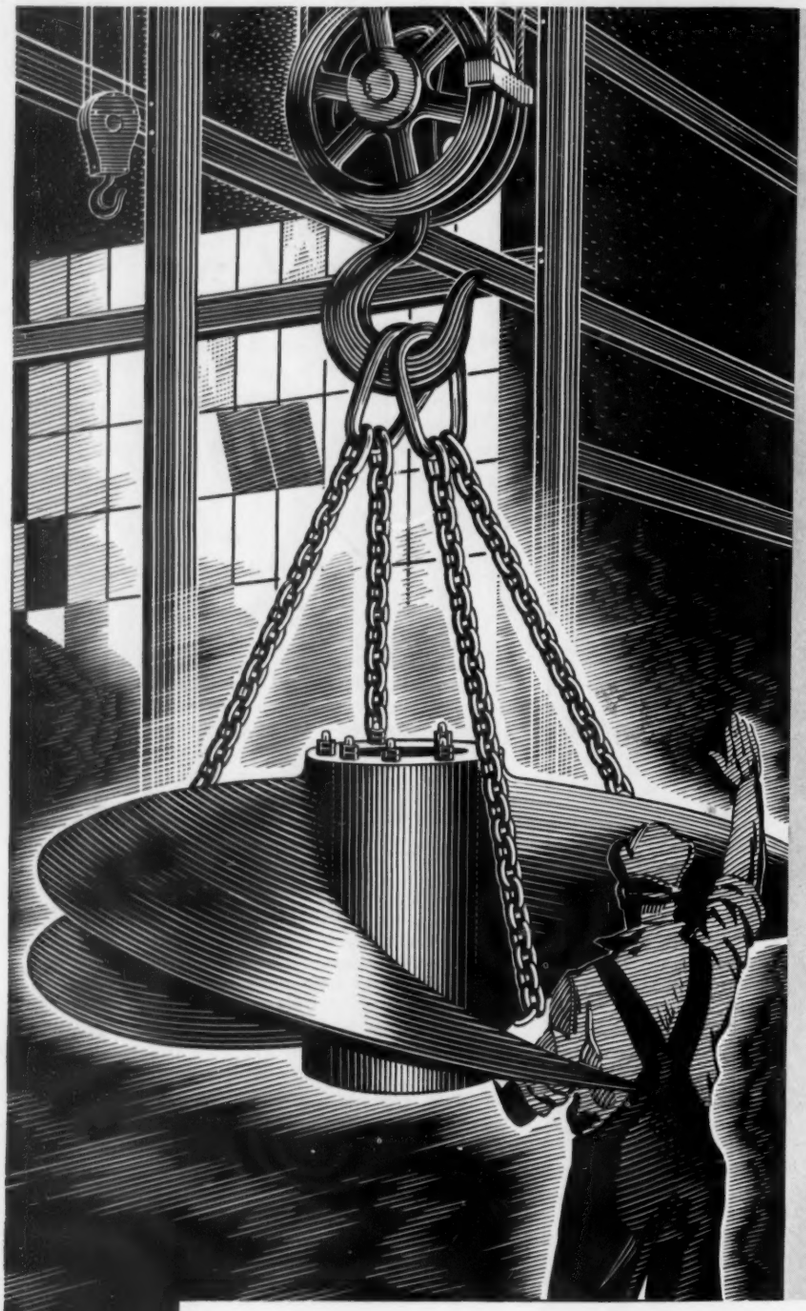

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As a chain is no stronger than its weakest link —or fitting or attachment—we make our chain accessories of the same metals and with the same care as our chains.

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answers your sling chain questions, tells about the use and care of all types of sling chains. ACCO engineers will advise regarding special situations without charge or obligation.

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AMERICAN CHAIN & CABLE COMPANY, INC.
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Sling Chains carry the load

PROGRAM

Annual Meeting of American Society of Tool Engineers

Detroit, March 24 to 28, 1941

A. H. d'ARCAMBAL
President, A.S.T.E.

FORD R. LAMB
Executive Secretary, A.S.T.E.

Monday, March 24—Preview Day

(Admission by Special Invitation Only)

AFTERNOON

Preview of exhibition for benefit of invited guests, including prominent executives, engineers, educators, Army and Navy officers and others active in national defense program.

EVENING

Preview dinner meeting (admission by special invitation only). Speaker—Maj. Gen. Charles M. Wesson, Chief of Ordnance, War Department; subject—"The Job Facing Industry in Arming This Nation"; toastmaster—L. Clayton Hill, manufacturing manager, Murray Corp., Detroit. Sponsors include: K. T. Keller, president, Chrysler Corp.; Edsel Ford, president, Ford Motor Co.; Charles E. Wilson, president, General Motors Corp.; C. W. Avery, president, Murray Corp.

Tuesday, March 25—Aircraft Night

CONVENTION HALL, 8:00 P.M.

Chairman: Walter F. Wagner, master mechanic, Lincoln Motor Car Co.

"Aircraft Engine Design and Production" by C. W. Van Ranst, chief aircraft engineer, Ford Motor Co.

"Tooling for Fuselage Production" (this paper will be jointly prepared by the Lockheed and Vultee organizations) by Louis Biehler, assistant chief tool designer, Vultee Aircraft Inc.

Discussion from the floor in charge of C. C. Carlton, acting director, Automotive Committee for Air Defense.

Wednesday, March 26—Navy Night

CONVENTION HALL, 8:00 P.M.

Chairman: Homer C. Bayliss, co-manager Detroit branch, Motch & Merryweather Machinery Co.

"Planning for Production of Naval Ordnance Units" by Joseph A. Davies, chief planner and estimator, Naval Gun Factory, Washington.

"Problems of Production of Naval Ordnance Units" by E. M. Sims, president, Metal Forming Corp., Elkhart, Ind.; member of board of directors, National Association of Manufacturers; member of National Defense Committee.

Thursday, March 27—Education Night

CONVENTION HALL, 8:00 P.M.

Chairman: Herbert D. Hall, president, Herbert Hall Co., Newark, N. J.

"Industry's Need in Skilled Help" by P. W. Brown, assistant works manager, Wright Aeronautical Corp., Paterson, N. J.

"How Connecticut Solved the Industrial Training Problem" by Carl A. Gray, president, Grenby Mfg. Co., New Britain, Conn.

J. R. Weaver, manager, Louisville Ordnance Division, and past president, A.S.T.E., will describe the work A.S.T.E. is doing for industrial training and will lead discussion from the floor.

Friday, March 28

BOOK CADILLAC HOTEL, 6:30 P.M.

A.S.T.E. Annual Dinner and Meeting

Chairman: A. H. d'Arcambal, president, A.S.T.E.; metallurgist, Pratt & Whitney Division, Niles-Bement-Pond Co.

Installation of new A.S.T.E. national officers; society reports.

"How To Prevent Sabotage to Our National Defense Program" by L. R. Pennington, administrative assistant to J. Edgar Hoover, director Federal Bureau of Investigation.

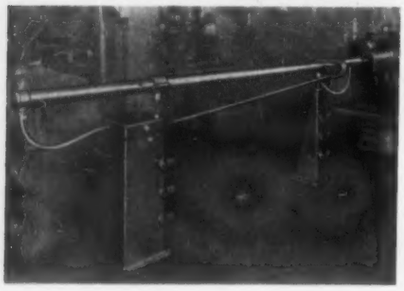
Plant Inspection Tours

(See Service Desk for Schedule)

Borg-Warner Corp.
Long Mfg. division
Chrysler Corp.
DeSoto division
Dodge division
Dodge Truck plant
Engineering department, Highland Park plant
Jefferson plant
Plymouth division
Ford Motor Co.
General Motors Corp.
Cadillac Motor Car division
Chevrolet Gear & Axle division
Greenfield Village
Hudson Motor Car Co.
Nash-Kelvinator Corp.
Packard Motor Car Co.
Thompson Products Inc.

Pneumatic Bar Feed

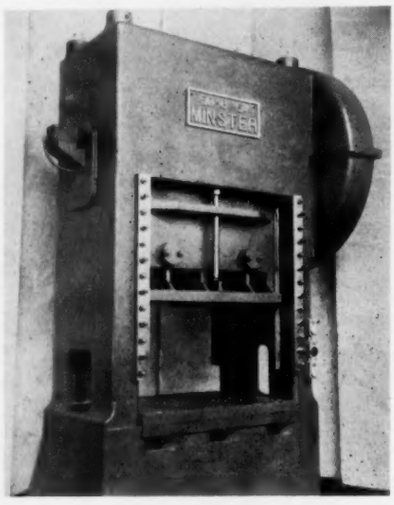
■ W. C Lipe Inc., Syracuse, N. Y., has introduced a new pneumatic bar feed unit, a self-contained automatic power stock feed device to be used in connection with machine tools having fixed stops for determining length of work. It feeds without surface contact and will not scratch or mar any material, feeding to any distance and holding the stock firmly against stop until the collet is closed. The unit, without setup change will handle all sizes and shapes within the capacity of the machine tool with which



it is used, and is especially valuable for feeding polished brass, aluminum, thin tubing, plastics, rectangular shapes, pinion rod, etc. It consists of an air cylinder sufficiently long to contain a full length stock bar, open at the forward end, adjustably mounted on two fabricated steel standards. Within the cylinder is a piston having a ball bearing cup center which supports the free end of the stock. Air is supplied to the cylinder at low pressure, and forces the piston forward against the end of the stock, causing piston and stock to move forward instantly when the collet is opened. Movement is very rapid. When the piston reaches the forward end of the cylinder the air pressure is automatically shut off and forward motion of the stock ceases. A coupler tube which floats in the spindle bore of the machine tool, supports the forward end of the new stock in alignment with the short piece and guides it into the collet of the machine. The bar feed is available in several models both for hand screw machines and turret lathes.

Double-Crank Press

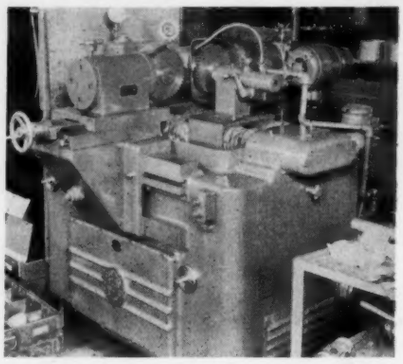
■ Minster Machine Co., Minster, O., announces a straight side, double-crank press which is rated at 75 tons capacity. It measures 54 inches between uprights and incorporates all the latest features for long equipment life. It features flexibility and



ease of operation, having an air operated synchronizing multiple disk friction clutch and brake, 7-inch barrel type motorized slide adjustment, totally enclosed dip lubricated gearing and bronze faced slide ways.

Lapping Unit for Aircraft Gears

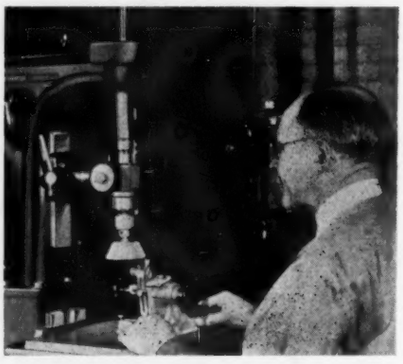
■ Michigan Tool Co., 7171 East McNichols road, Detroit, has introduced a new type highly flexible 2-lap lapping machine for aircraft engine gears. It is automatic in operation and in spite of its high flexibility to accommodate a wide variety of sizes and types of gears, is designed for high production lapping of moderate and small size gears. Operating on the crossed-axis principle, its features include a relatively low surface speed of rotation and high speed of reciprocation of the laps across the faces. The latter may be adjusted from 90 to 300 reciprocations a minute. Change gears permit ready adjustment of the lap spindle speed from 52 to 283 revolutions per minute. A third adjustment provides selection of desired reciprocating stroke length. At the end of the lapping cycle one head



and lap retracts, permitting quick unloading and reloading of the machine. The arrangement is such that when the retracted head returns, its lap will always be in mesh with the gear to be lapped.

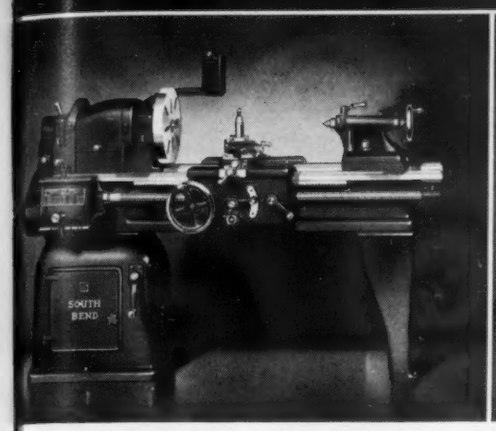
Grinding Fixture

■ Roan Mfg. Co., 1218C Washington avenue, Racine, Wis., announces a new end mill grinding fixture to speed shop production and prevent tie-ups of the regular tool grinder. Weighing only 8 pounds and measuring no more than 5 x 7 inches, it will grind an end mill in five minutes. The grinding wheel slips into the chuck of any high-speed drill press—converting it into a tool grinder at small cost. The fixture, which takes single or double end mills, straight or tapered shanks, right or left-hand, grinds mills up to 1-inch shank diameter, is equipped with an arbor that fits a ⅜-inch capacity drill press chuck. It will hold end mills of any size up to a Brown & Sharpe No. 9, and also grinds hollow mills, counterbores and other

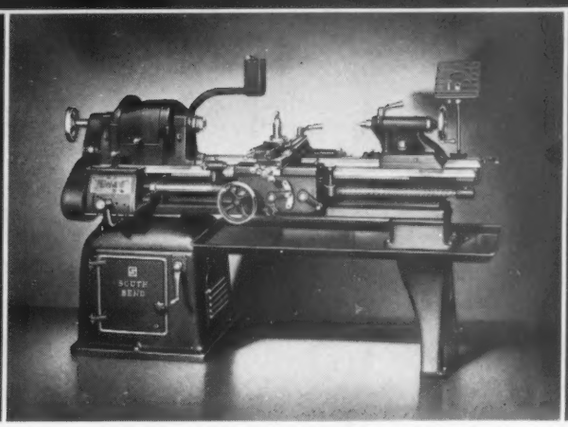


facing tools of practically all needed sizes. It has a movable V-block with a ¾-inch movement, regulated by a fine-threaded thumb screw for delicate adjustment, with both bottom stop and spring-finger stop fixed to this block. In addition, the fixture is equipped with a leveling screw.

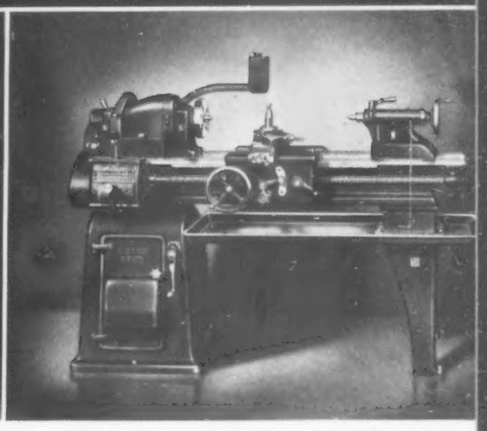
The RIGHT *Lathe For Every Shop Need*



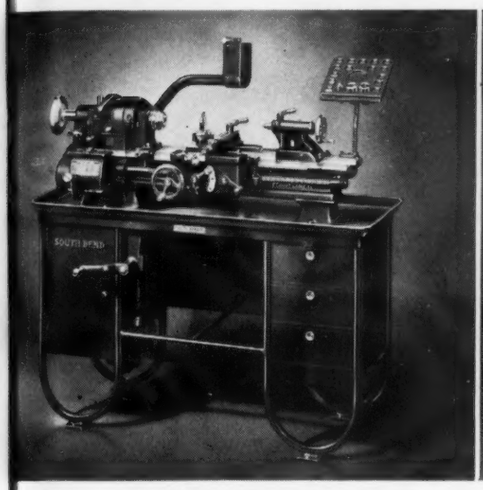
16″ swing South Bend Underneath Motor Drive Quick Change Gear Precision Lathe.



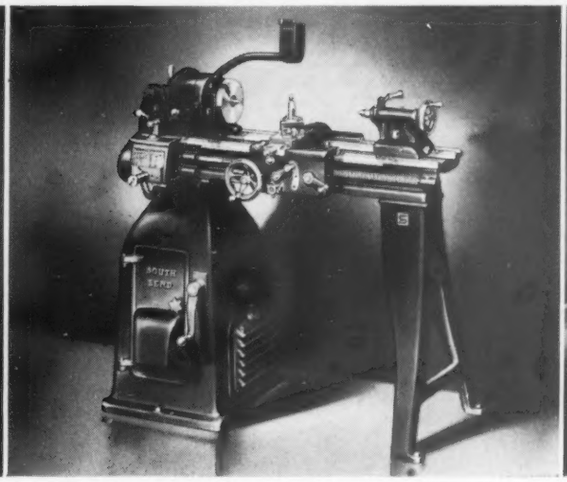
14½″ swing South Bend Tool Room Underneath Motor Drive Precision Lathe.



13″ swing South Bend Underneath Motor Drive Quick Change Gear Precision Lathe.



10″ swing 1″ Collet South Bend Tool Room Underneath Motor Drive Precision Bench Lathe.



10″ swing 11/16″ Collet South Bend Underneath Motor Drive Quick Change Gear Precision Lathe.

9″ swing Model A South Bend Workshop Quick Change Gear Precision Bench Lathe.

THE importance of selecting the *Right* lathe for every shop need is emphasized today by the demand for increased production resulting from our national emergency. Maximum production at minimum cost can be attained only when the lathe is matched perfectly with the job.

Consider the work to be done, then choose the size and type of lathe that will give the most efficient service. Remember that versatility and precision are important in a tool room lathe. For manufacturing operations, a lathe must also have plenty of power, speed, and stamina.

South Bend Lathes are made in a variety of sizes and types that will efficiently handle a wide range of metal working requirements. They can be supplied with equipment for precision tool room work, manufacturing operations, general machine work, and for many special classes of service.

Consult our Engineering Department about the lathe best suited to your work. We do no special tooling, make no special machines, but we will gladly give you our recommendation. A copy of our new Catalog No. 100A describing all sizes and types of South Bend Lathes will be sent on request.

ON DISPLAY IN ALL PRINCIPAL CITIES

BALTIMORE, MD.—Carey Machinery & Supply Co.
BOSTON, MASS. — South Bend Lathe Works †
BRIDGEPORT, CONN.—A. C. Bisgood
BUFFALO, NEW YORK—R.C. Neal Company, Inc.
CHICAGO, ILL. — South Bend Lathe Works ‡
CLEVELAND, OHIO — Reynolds Machinery Co.
HOUSTON, TEX.—Wessendorff, Nelms & Company
LOS ANGELES, CAL.—Eccles & Davies Mach. Co.
MILWAUKEE, WIS.—W. A. Voell Machinery Co.
NEWARK, N. J.—J. R. Edwards Machinery Co.
NEW ORLEANS, LA.—Dixie Mill Supply Co., Inc.
NEW YORK, N. Y.—A. C. Colby Machinery Co.
PHILADELPHIA, PA. — W. B. Rapp, Machinery
PITTSBURGH, PA. — Tranter Manufacturing Co.
PROVIDENCE, R. I. — Geo. T. Reynolds & Son
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SAN FRANCISCO, CAL. — Moore Machinery Co.
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†BOSTON Sales Office: 67 Broadway, Kendall Square, Cambridge, Mass., Phone Trowbridge 6369.
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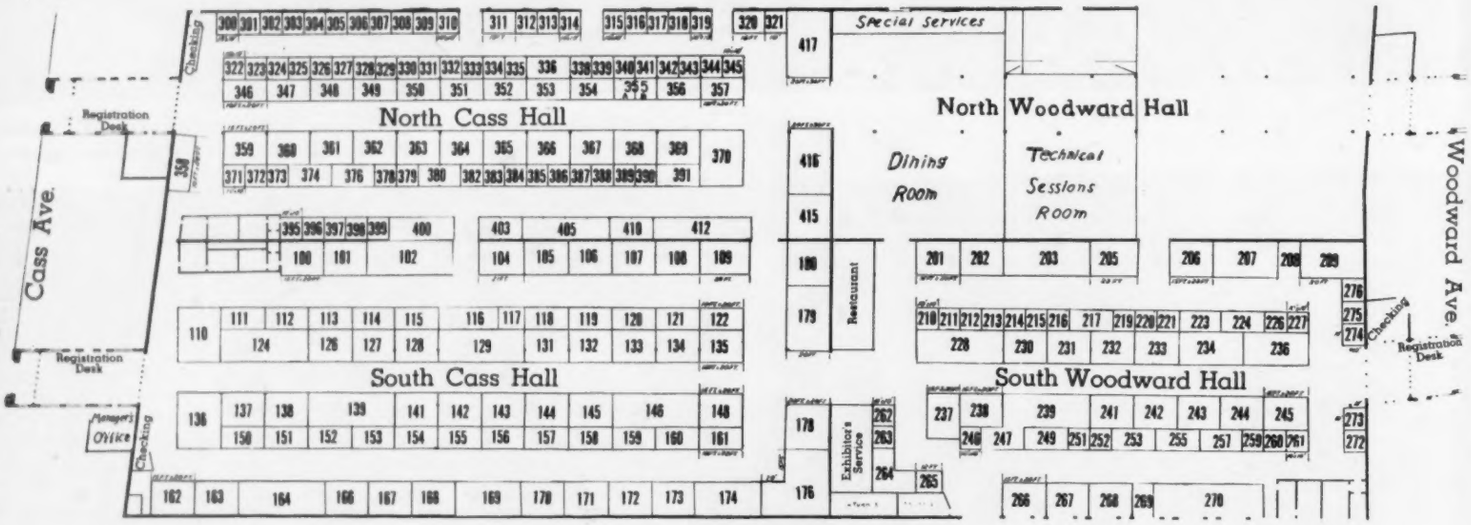
EXHIBITORS and PRODUCTS

A. S. T. E. 1941 . . . Machine and Tool Progress Exposition . . . March 25 to 29, 1941 . . . Convention Hall . . . Detroit



Abrasive Co., Philadelphia 113
Grinding wheels and abrasives.

Abrasive Dressing Tools Co., Detroit 327
Diamond lapping machines.

Allen Mfg. Co., Hartford, Conn..... 220
Socket screws.

Allis-Chalmers Mfg. Co., Milwaukee.....145, 391
Electric motors; V-belt drives; pumps; welders.

American Broach Sales Co., Detroit 247
Tools.

American Chain & Cable Co., Andrew C. Campbell division, Bridgeport, Conn. 205
Abrasive cut-offs; nibbling machines.

American Machinist, New York 176
Publications.

Ames Co., B. C., Waltham, Mass..... 367
Gages and dial indicators.

Ampco Metal Inc., Milwaukee 357
Nonferrous alloys.

Anderson & Sons, Westfield, Mass..... 201
Imprinting machines; etched and lithographed metal.

Apex Machine & Tool Co., Dayton, O..... 172
Tools, chucks, collets, universal joint devices.

Armstrong Bros. Tool Co., Chicago..... 274
Machine shop tools.

Atlas Press Co., Kalamazoo, Mich..... 360
Lathes, presses, other machine tools.

Automotive Industries, Philadelphia 226
Publications.

Barber Colman Co., Rockford, Ill..... 100
Small tools.

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Hack saw blades and metal cutting band saws.

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Special drills.

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Drill and tap grinders; tool holders.

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Vertical milling machines.

Boggis & Co., Henry P.; Cleveland..... 216
Tap sharpening equipment.

Boice-Crane Co., Detroit 355-A
Drill presses & tapping machines; band saws; power tools.

Boyar-Schultz Corp., Chicago 119
Profile grinders; screw machine box tools.

Bridgeport Machines Inc., Bridgeport, Conn..... 353
Turret milling machines and attachments.

Bristol Co., Waterbury, Conn. 397
Socket screw products.

Brown & Sharpe Mfg. Co., Providence, R. I..... 104
Machinists' tools; pumps; magnetic chucks.

Bruning Co. Inc., Charles; Detroit..... 132
Printing and developing machines.

Brush Development Co., Cleveland 388
Surface analyzers and generalizers.

Carboloy Co., Inc., Detroit 124
Cemented carbide tools, dies and dressers.

Carborundum Co., Niagara Falls, N. Y..... 203
Abrasive products.

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Tool steels.

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THIS PIN ASSURES LOW MAINTENANCE

on FERRACUTE PRESSES

LOW MAINTENANCE is the big story about the FERRACUTE Automatic PIN CLUTCH.

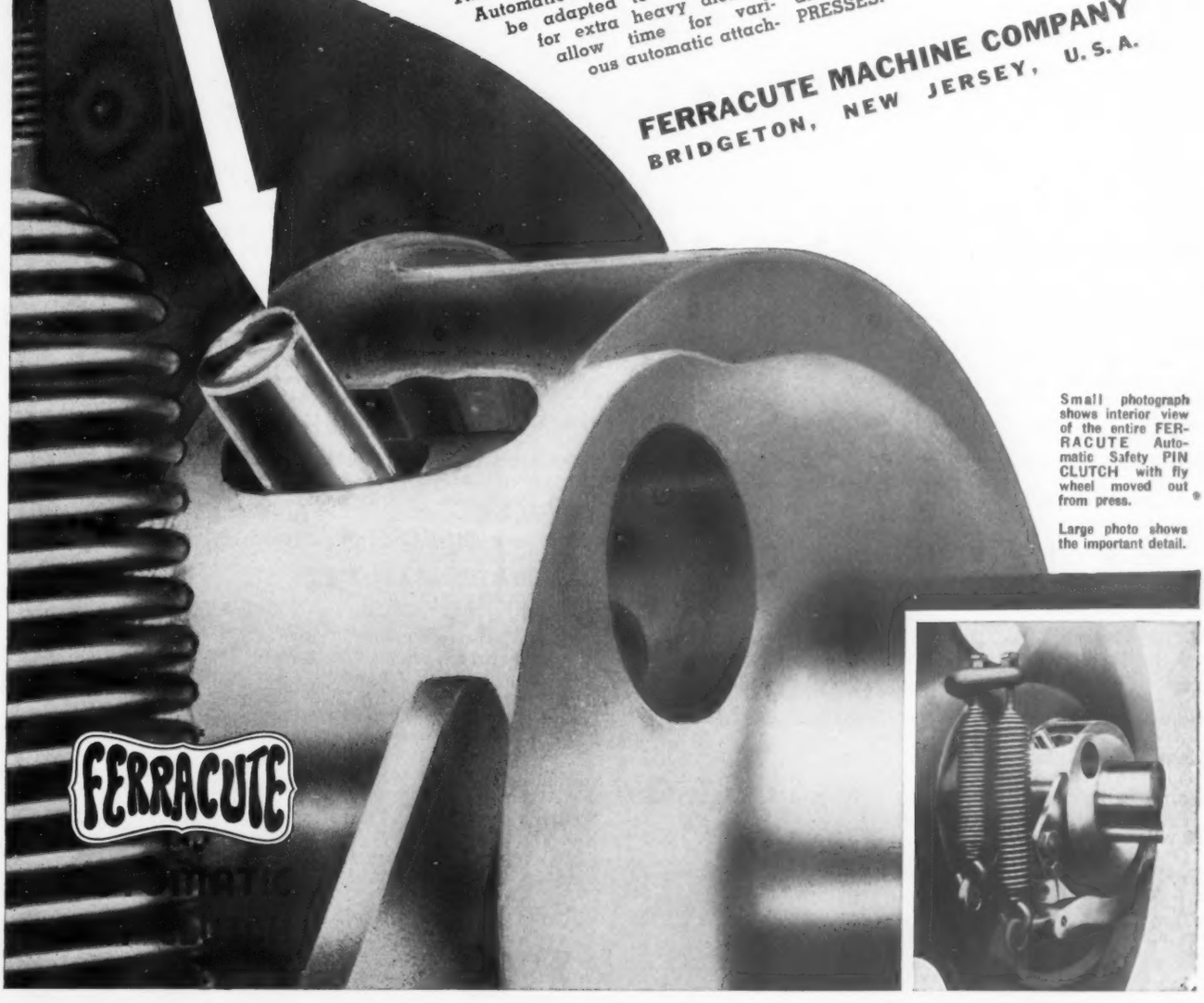
GUARDING AGAINST OVERLOADS. The pin itself and other clutch parts are engineered to perform perfectly under all normal conditions but to give way before OVERLOAD can damage more costly press parts.

ADJUSTMENT TO VARIED NEEDS. The one Ferracute Automatic PIN CLUTCH can be adapted to compensate for extra heavy dies, to allow time for various automatic attachments, to provide a "safety" single-stroke mechanism or a continuous operating press for high-production lines.

EASY, FAST REPLACEMENT. Parts are easily, quickly replaced. In fact, in case of EMERGENCY break-down, all parts, being round, can be made in any ordinary machine shop. Alloy steel throwout cam is replaceable.

LUBRICATION. Ordinary machine oil is all that is needed. The FERRACUTE Automatic PIN CLUTCH is standard on all small and medium sized FERRACUTE PRESSES.

FERRACUTE MACHINE COMPANY
BRIDGETON, NEW JERSEY, U.S.A.



Small photograph shows interior view of the entire FERRACUTE Automatic Safety PIN CLUTCH with fly wheel moved out from press.

Large photo shows the important detail.

Chicago Metal Hose Corp., Maywood, Ill. 249
Flexible metal hose and bellows.

Chicago Rivet & Machine Co., Chicago 114
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Cincinnati Tool Co., Cincinnati 322
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Circular Tool Co., Providence, R. I. 163
Circular metal cutting saws; drills; reamers.

Conover-Mast Corp., New York 275
Publications.

Consolidated Machine Tool Corp., Rochester, N. Y. ... 348
Cutters, chucks, taps, die heads.

Continental Machines Inc., Detroit 358
Metal working equipment.

Charts Co. Inc., Arthur A.; Boston 261
Drafting and engineering equipment.

Curtis Industrial Designing Engineers, Detroit 369
Low melting point alloys.

Delta Mfg. Co., Milwaukee 139
Grinders; drill presses; machines; accessories.

Detroit Power Screwdriver Co., Detroit 155
Magazine feed power screwdrivers.

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Operator training.

Detroit Universal Duplicator Co., Detroit 403
Duplicators and duplicator-lathe combinations.

DeWalt Products Co., Lancaster, Pa. 355-B
Cutting equipment for metal and wood.

Dewar Mfg. Co., Brooklyn, N. Y. 314
Carbide lamps.

Dietzgen Co., Eugene; Chicago 237
Drafting, surveying and reproduction equipment.

Dumore Co., Racine, Wis. 143
Grinders.

Duro Metal Products Co., Chicago 120
Wood and metal working equipment.

Engineering Sales Co., Sheboygan, Wis. 309

Esco Engineering Corp., Detroit 224
Drill jigs.

Experimental Tool & Die Co., Detroit 335
Universal slotting heads.

Farmer Co., Ray H.; Detroit 405
Grinders; welders; drill chucks; automatic machines.

Fauver Co. Inc., J. N.; Detroit 169
Hose assemblies.

Federal Products Corp., Providence, R. I. 267
Precision measuring instruments.

Firth-Sterling Steel Co., McKeesport, Pa. 235
Sintered carbide tools; parts; dies; special steels.

Ford Motor Co., Dearborn, Mich. 276
Johansson gage blocks and accessories.

Gairing Tool Co., Detroit 126
Standard and special tools.

General Electric Co., Schenectady, N. Y. 107
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George Machinery Co., James W.; Detroit 412
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Goodspeed-Detroit Co., Detroit 380
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Gorham Tool Co., Detroit 128
Defense items; high-speed steel tools.

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Grob Brothers, Grafton, Wis. 150
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Hamilton Mfg. Co., Two Rivers, Wis. 141
Drafting room equipment.

Hamilton Standard Propellers, East Hartford, Conn. 245
Propellers and propeller parts.

Hammond Machinery Builders, Detroit 154
Grinders and polishers.

Hannifin Mfg. Co., Chicago 243
Air and hydraulic equipment.

Hardinge Brothers Inc., Elmira, N. Y. 127
Fixtures and other machine tool accessories.

Hartford Special Machinery Co., Hartford, Conn. ... 311
Thread, gear and cam grinding equipment.

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Die polishing, lapping machines.

Heller Brothers Co., Detroit 399
Files, hammers and heavy wrenches

Hitchcock Publishing Co., Chicago 272
Publications.

Holo-Krome Screw Corp., Hartford, Conn. 156
Socket screw products.

Houghton Co., E. F.; Philadelphia 116
Cutting oil, lubricant; leather belting; rust preventives.

Hunt & Sons, C. B.; Salem, O. 134
Air, hydraulic valves and hose couplings.

Huot Mfg. Co., St. Paul 219
Drill indexes.

Illinois Tool Works, Chicago 270
Metal cutting tools; measuring machines.

Independent Pneumatic Tool Co., Chicago 273
Portable electric tools.

Industrial Equipment Co., Detroit 347
Hydraulic oil hose and accessories.

Industrial Press, New York 111
Publications.

International Nickel Co. Inc., New York 374
Nickel alloys, Monel, Alnico, etc.

Iron Age, New York 105
Publications.

Janette Mfg. Co., Chicago 378
Speed reducers; rotary electric equipment.

Jarvis Co., Charles L.; Middletown, Conn. 144
Flexible shafts; machines and tools; accessories.

Johnson Gas Appliance Co., Cedar Rapids, Iowa 321
Heat treating furnaces; gas-fired devices.

Jones-Fors Co., Detroit 171
Tools.

Jones & Lamson Machine Co., Springfield, Vt. 137
Comparators and measuring machines.

Joyce-Grindland Co., Dayton 376
Jacks and lifts.

Keuffel & Esser Co., Detroit 207
Drafting room equipment.

Knu-Vise Inc., Detroit 251
Clamping accessories.

Koebel Diamond Tool Co., Detroit 148
Diamonds, diamond tools.

Larkin Packer Co. Inc., Davis Boring Tool division, St. Louis 263
Boring and facing tools; reamers.

LeMaire Tool & Mfg. Co., Dearborn, Mich. 365
Drill presses; notching machines.

Link Engineering & Mfg. Co., Detroit 117
Spring checkers; pressure and compression testers.

Lipe Inc., W. C.; Syracuse, N. Y. 158
Special machinery and parts.

Lufkin Rule Co., Saginaw, Mich. 227
Measuring tapes, rules and precision tools.

Lyon Metal Products Inc., Aurora, Ill. 359
Toolroom storage equipment.

McCaskey Register Co., Alliance, Ohio 266
Tool and other control systems.

McCord Radiator & Mfg. Co., Detroit 385
Unit heaters.

McKenna Metals Co., Latrobe, Pa. 345
Alloy tools, blanks, lathe centers.

M-B Products, Detroit 121
Pneumatic devices.

Machinery Mfg. Co., Los Angeles 356
Machine tools.

Macklin Co., Jackson, Mich. 161
Grinding wheels.

Mall Tool Co., Chicago 255
Portable power tools; flexible shaft equipment.

Manufacturers Sales Co., Detroit 153
Flexible shaft machines and rotary files.

Marburg Brothers Inc., New York 206
Machine tools and accessories.

Martindale Electric Co., Cleveland 221
Flexible shaft equipment; etchers; masks.

Michigan Broach Co., Detroit 173
Finished broach work.

Michigan Tool Co., Detroit 138
Machine tools and worm gears.

Michigan Unemployment Compensation Commission, Detroit 260
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Micromatic Hone Corp., Detroit 108
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Midway Machine Co., St. Paul 300
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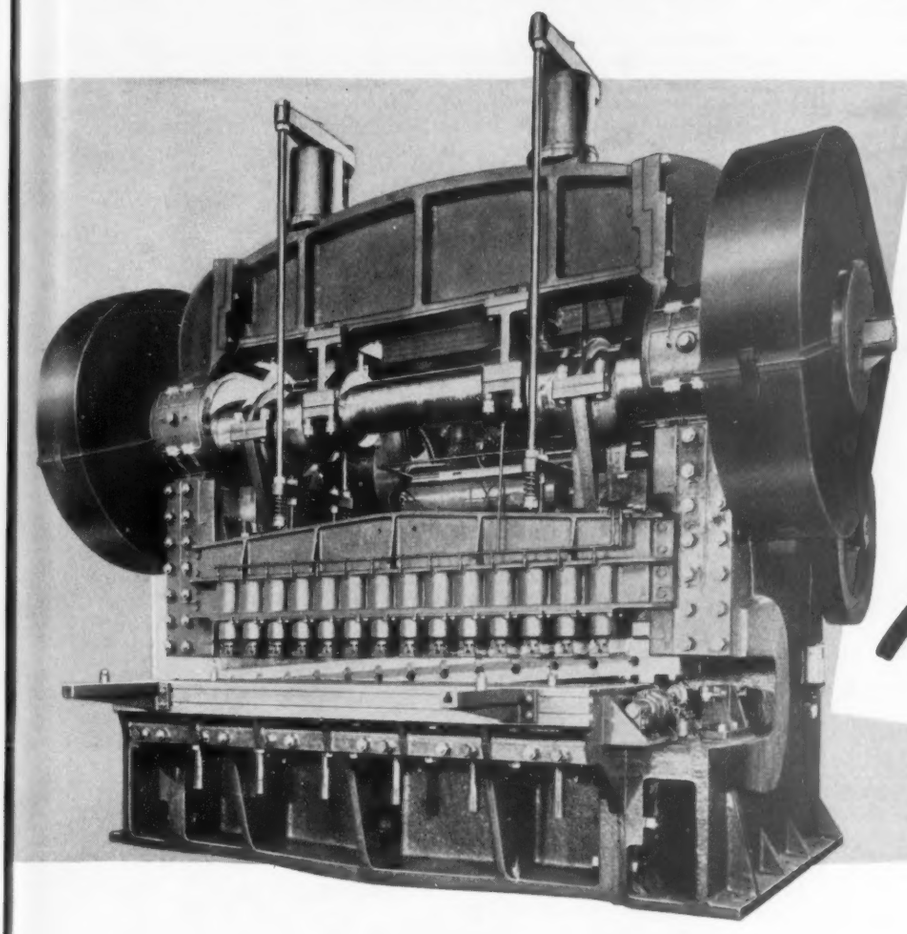

Strength AND Rigidity

World's largest press made of Steel Castings

This recently built Plate Shear, built for a large steel mill, is said to be the largest machine of its type ever constructed. It will shear plates up to 162 inches wide, and up to 2½ inches thick, at one stroke. The machine weighs over half a million pounds.

Obviously such a huge machine, built for such heavy duty, demands the maximum in strength and rigidity. The builder writes us: "Cast Steel has been used throughout because of its proved strength and rigidity, which are so necessary in a machine of this type."

And yet Cast Steel is an equally suitable material for parts weighing only a pound or two. It is industry's most adaptable material. It permits scientific streamlined weight distribution without excess weight, with maximum strength exactly where it is most needed. It permits combinations of parts in a single casting, saving on finishing, fitting and assembly time. And a wide range of mechanical properties are available to meet all operating conditions.

Whether your products are large or small, you can doubtless use more steel castings, and benefit from these important advantages. Steel castings are the modern material for mechanical construction—efficient, dependable and economical.

Why not consult your local foundryman and get his recommendations? Or you may write, without obligation, to Steel Founders' Society, 920 Midland Bldg., Cleveland, O., where you may draw upon a broad fund of practical experience.

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Hydraulic equipment.

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Minster Machine Co., Minster, Ohio 228
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Modern Machine Shop, Cincinnati 233
Publications.

National Broach & Machine Co., Detroit 102
Testers; cutting tools and broaches.

National Tool Salvage Co., Detroit 173
Reconditioned tools.

National Youth Administration, Detroit 410
Operator training methods.

Nicholson File Co., Providence, R. I. 384
Files.

Niles-Bement-Pond Co., Pratt & Whitney division, Hartford, Conn. 129
Tools; gages; Kellerflex machines.

Norton Co., Worcester, Mass. 164
Abrasive products.

O K Tool Co. Inc., Shelton, Conn. 244
Cutters; reamers; other tools; accessories.

Oakite Products Inc., New York 354
Compounds for cutting, grinding, rust proofing.

Ohio Crankshaft Co., Cleveland 202
Localized surface hardening equipment.

Oil Gas Combustion Co., New Haven, Conn. 310
Furnace equipment.

Ozalid Corp., Ozalid Products division, Johnson City, N. Y. 106
Printing and developing machines.

Parker-Kalon Corp., New York 215
Cold-forged socket screws.

Pease Co., C. F.; Chicago 180
Blue printing, developing equipments.

Penton Publishing Co., Cleveland 168
Publications—STEEL, MACHINE DESIGN, THE FOUNDRY, NEW EQUIPMENT DIGEST, DAILY METAL TRADE.

Peters Co., Detroit 390
Patch for mending tracings; pencils.

Pfeil Inc., George H.; Detroit 253
"Bostitch" steel stitchers, stapling machines and tackers.

Physicists Research Co., Ann Arbor, Mich. 112
Surface finish and similar special test equipment.

Pike & Co., E. W.; Elizabeth, N. J. 371
Illuminated magnifiers and microscopes.

Pioneer Engineering & Mfg. Co., Detroit 239
Pumps.

Porter-Cable Machine Co., Syracuse, N. Y. 208
Machine sanders, grinders; saws.

Producto Machine Co., Detroit 324
Master die sets, accessories and small tools.

Progressive Welder Co., Detroit 370
Welding equipment.

Pyro-Electro Instrument Co., Detroit 372
Hardness testers.

Racine Tool & Machine Co., Racine, Wis. 265
Pumps and valves.

Ready Tool Co., Bridgeport, Conn. 160
Lathe centers and accessories.

Reeves Pulley Co., Columbus, Ind. 122
Variable-speed transmissions, pulleys and drives.

Robertson & Donaldson, Detroit 361
Bandsaws, blades; pulleys.

Ross Operating Valve Co., Detroit 170
Air valves.

Rotor Tool Co., Cleveland 238
Portable tools.

Safety Socket Screw Corp., Chicago 328
Socket devices; screws; studs.

Scheer Co., George; New York 241
Tools.

Schneible Co., Claude B.; Chicago 320
Dust and fume collection equipment.

Schrader's Son, A.; Brooklyn, N. Y. 252
Pneumatic controls and accessories.

Screw Machine Publishing Co. Inc., Rochester, N. Y. 259
Publications.

Scully-Jones & Co., Chicago 142
Production tools.

Severance Tool Mfg. Co., Saginaw, Mich. 349
Small tools.

Shakeproof Lock Washer Co., Chicago 270
Screws, washers and other fasteners.

Sheffield Gage Corp., Dayton, Ohio 400
Gaging, measuring instruments.

Singer Sewing Machine Co., Detroit 223
Industrial sewing machines.

Skilsaw Inc., Chicago 217
Portable electric tools.

Smith Co., Roy; Detroit 302
Welding supplies.

Snyder Tool & Engineering Co., Detroit 131
Special machines.

Sommers & Adams Co., Cleveland 395
Vertical spindle milling machines.

South Bend Lathe Works, South Bend, Ind. 336
Precision lathes.

Standard Gage Co., Poughkeepsie, N. Y. 101
Gages, dial indicators, comparators.

Standard Shop Equipment Co., Philadelphia 262
Nuts, washers, fastening devices.

Stanley Works, Stanley Electric Tool division, New Britain, Conn. 213
Electric tools, accessories.

Starret Co., L. S.; Athol, Mass. 157
Tools; indicators; saw blades; tapes.

Sterling Tool Products Co., Chicago 373
Portable electric tools.

Stokerunit Corp., Milwaukee 110
Precision boring machines.

Strelinger Co., Charles A.; Detroit 166
Steel stitchers, box stitchers.

Strong, Carlisle & Hammond Co., Cleveland 115
Mac-it alloy steel screws.

Stuart Oil Co., D. A.; Chicago 174
Machine tool lubricants.

Sun Oil Co., Philadelphia 389
Petroleum products.

Sunnen Products Co., St. Louis 350
Honing machines.

Super Tool Co., Detroit 133
Tungsten carbide metal and tipped tools.

Taft-Peirce Mfg. Co., Woonsocket, R. I. 364
Gages; accessories; contract machine work.

Texas Co., Chicago 386
Cutting fluids and machined parts.

Tinnerman Products Inc., Cleveland 232
Speed nuts, Speed clips.

Toledo Scale Co., Toledo, Ohio 352
Scales and measuring devices.

Tomkins-Johnson Co., Jackson, Mich. 230
Air and hydraulic equipment.

Tool-Die-Machine Progress, Cleveland 396
Publications.

Towmotor Co., Detroit 152
Lift trucks.

Tubular Rivet & Stud Co., Woolaston, Mass. 346
Riveting machines.

Ultra Lap Machine Co., Detroit 212
Lapping machines and lapped parts.

Union Carbide Co., New York 362
Haynes Stellite cutting tools and products.

United Aircraft Corp., East Hartford, Conn. 245
Aircraft and parts.

Univertical Machine Co., Detroit 390
Bench-type vertical mill.

Vickers Inc., Detroit 178
Hydraulic equipment.

Vinco Corp., Detroit 242
Gages, master gears, checkers.

Weldon Tool Co., Cleveland 246
Cutting, forming tools.

Western Mfg. Co., Detroit 251
Gear transmissions.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. 179
Welders, motors, controls.

Wetmore Reamer Co., Milwaukee 398
Reamers; boring bars; tools.

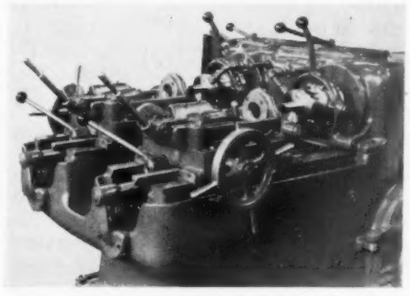
Williams & Co., J. H.; New York 382
Drop-forgings and drop-forged tools.

Wilson Mechanical Instrument Co. Inc., New York 211
Rockwell hardness testers.

Ziegler Tool Co., W. M.; Detroit 210
Floating tool holders.

Shell Tapper

■ Landis Machine Co. Inc., Waynesboro, Pa., has introduced a new HO shell tapper for tapping smaller size shell which cannot be handled efficiently with the No. 1½ R unit announced previously in STEEL. It features for its basic design the Landmaco threading machine with a collapsible tap substituted for the usual die head. A special work holding device provides the rigid and constant support for the parts to be tapped. Of the ALT type, the tap is designed primarily for cutting straight threads. Means are provided in the special trip ring of the tap to direct the flow of cutting coolant within the bore of the work to assure a constant and an ample supply throughout the tapping operation. The special work holding device is mounted directly on the carriage of the machine. It comprises bushing to support the nose end of the shell and either a male or female rear centering bushing, depending upon the type of part to be threaded. This not only supports the base end of the shell but also provides the clamping action for supporting the work in the fixture. The rear centering bushing is mounted on a slide in direct contact with a lever operated cam employed to advance the bushing and which also



provides the means for locking the work in the fixture. A pressure spring returns the bushing releasing the work when the operator releases the cam. This unit is adjustable for work of different lengths within the range of 60 and 81 millimeter mortar shell of the high explosive type, and also is suitable for the 3-inch British mortar type shell. The tapper is one of the lead screw type. It is made primarily in the double spindle model since one operator can operate efficiently both die heads and practically double the production.

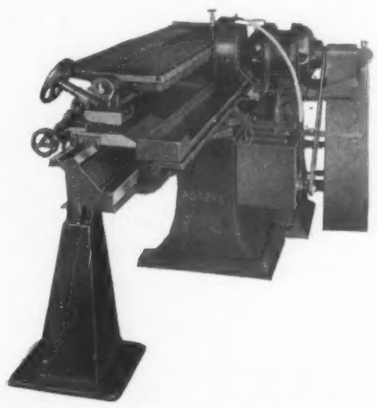
Tool Grinder

■ T.C.M. Mfg. Co., Harrison, N. J., has placed on the market an all-in-one grinding and lapping machine for the maintenance of cutting tools of all types. Offered in bench and floor models, it has five types of head assemblies with alternative wheel and lap equipment. Complete accessory equipment is available. Included in this equipment are a groove grinding device for forming chip control grooves in cemented carbide tips, a production type protractor with micrometric feed for duplication of tool profiles, a tip cutting attachment for resizing and salvaging carbide tips and a drill grinding attachment which

has a capacity from ¼ to 1¼-inch diameter twist drills. The unit is powered by a motor which operates at 1750 revolutions per minute. Right and left-hand tools are ground with equal facility by having a 10-degree convex angle on the face of the grinding wheels and diamond metal laps. The slight concavity formed on the ground face facilitates the lapping of the small lands on the cutting edges of carbide tips. A specially designed brazing fixture is available for those who wish to braze their own tips on the tool shanks or bodies.

Armor Plate Grinder

■ S. C. Rogers & Co., 191 Dutton avenue, Buffalo, have recently adapted their type R grinder so that it is



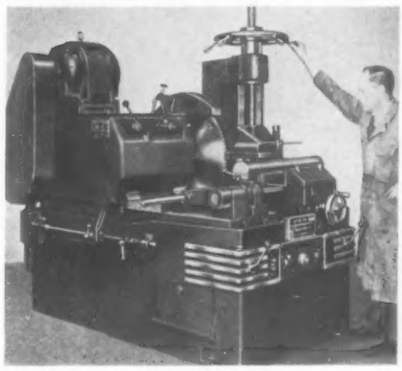
now capable of sizing light armor plate up to 1-inch thick. To enable

Industrial Equipment

handling the work, it is equipped with an extra heavy carriage and platen. The carriage is designed with 3-point bearings to withstand heavy duty service. The platen is 20 inches wide with a T-slot conveniently located at the front edge to facilitate clamping the work. The grinder is available in sizes of 48, 60, 76 and 84 inches.

Cold Sawing Machine

■ Motch & Merryweather Machinery Co., 715 Penton building, Cleveland, has introduced a new No. 3 high-speed cold sawing machine for making square cuts. Its rugged saw carriage encloses the entire blade

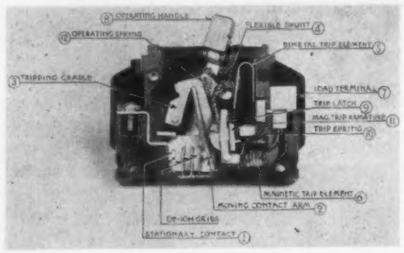


drive, and the clutch is controlled through a lever at the front of the carriage. Another clutch lever at the rear sets the chip-remover and hydraulic feed provides stepless variable feed and quick return. Timken roller bearings on high speed shafts, automatic lubrication, twin-disk clutch, correct belt tension and ample bed ways prevent chatter. The central panel of the unit contains a stop-and-go push button which controls all the electrical equipment, as well as an ammeter that measures the power consumed —also helps to indicate when the saw blade needs to be resharpened. A 2-horsepower, 1200 revolutions per minute motor operates the Vickers hydraulic low pressure system, while a 10-horsepower, 1800 revolutions per minute motor is used for the head. Nine blade speeds ranging from 18 to 134 feet per minute are available. The blades have

deeply rounded flutes and reinforced, radial ground teeth. The segments are of tool steel with a heat-treated center. Standard equipment includes a 28-inch saw blade capable of cutting 9⅝-inch round stock and 8⅝-inch square stock at 90 degrees. (The 30-inch blade, slightly extra, gives an additional 1-inch range.)

Circuit Breaker

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced a new Quicklag circuit breaker which combines in a single unit a co-operated thermal and magnetic trip action. The difference between this unit's tripping action and that of former breakers employing only thermal or magnetic methods may be understood by following through its operation. When connected in a circuit, the line is normally connected to the stationary contact (1). With contacts closed, current flows through the line terminal, or stationary contact (1), to the moving contact arm (2), through the tripping cradle (3), the flexible shunt (4), the bimetal element (5), the coil of the magnetic element (6) and finally to the load terminal (7). Normal opening or closing is done by moving the operating handle (8). The dead-center spring pressure arrangement between the tripping cradle (3) and the operating handle (8) gives a quick make-and-break action. On overloads, the breaker trips by mutual operation of the bimetallic and the magnetic elements. Automatic tripping takes place when the trip latch (9) holding the tripping cradle (3) in its normal position is unlatched. When this happens, the cradle (3) swings upward to the right, displacing the dead center position of the operating spring (12) with consequent contact opening. The trip latch (9) is normally in the latched position. The spring (10) tends to unlatch it by pulling on the magnetic trip armature 11. But this unlatching force is balanced by an opposite force exerted by the bimetal element. Thus a state of sensitive



equilibrium exists, which can be broken by only two methods—heating of the bimetal or increase in magnetic flux. On light loads the magnetic element is not sufficiently strong to influence the armature to any great extent and tripping is accomplished by action of the bimetal only.

Speed Test Rig

■ Link-Belt Co., Huntington Park avenue, Philadelphia, announces a compact, fully enclosed variable speed test rig which combines the basic P.I.V. unit and an adjustable mounting bracket on a rigid welded steel base. It can be used for testing generators, magnetos, governors, vibrators, pumps, springs, sewing machines, bearings and other types of specialized equipment. The tests usually made are for determining whether the equipment tested runs true, functions efficiently, carries the load properly, and for

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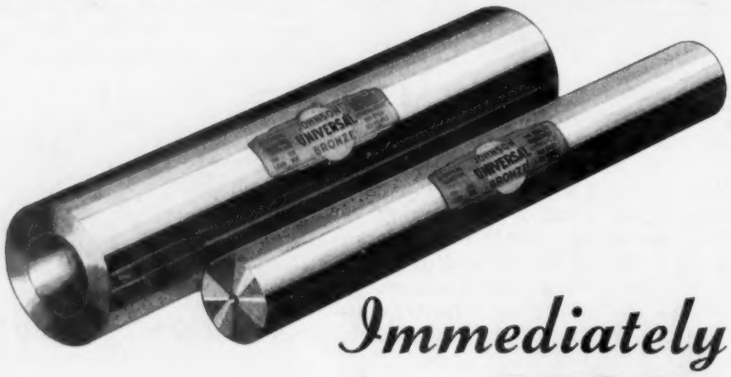

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calibrating. The mechanism to be tested can be placed in position on the horizontally-adjustable mounting bracket; moved up as required; and then connected to the variable-speed output shaft of the P.I.V. transmission. Various sizes of units can be accommodated because of an adjustable feature, and the bracket itself can be constructed to suit the design of the parts to be mounted and tested. An electric tachometer and calibrated speed indicator driven from the variable speed shaft, provide the means for observing the exact speed at which the mechanism is being tested. Two controls are provided—a direct, hand wheel control, and a vernier control, through a secondary hand wheel, for extra-precise or micrometer-like speed selection.

Eyeshield

■ Jackson Electrode Holder Co., 15122 Mack avenue, Detroit, has introduced an improved eyeshield for use during gas welding, cutting and blow torch operations. Designated as type BX, it is a coverall type of shield, the use of which does not interfere with the wearing of prescription glasses. Enlarged opaque fiber side pieces afford greater protection, the light

frame fitting snugly to forehead and cheeks. The shield takes a standard 2 x 4¼-inch lens, secured in the lens retaining frame by an improved spring. Connection between shield and headgear provides better adjustment of lens angle. Its lightness and nonfogging features encourage its use.

Automatic Lubricator

■ Ace Lubricating Equipment Co. Inc., 2345 West Grand boulevard, Detroit, has developed an automatic lubricator for use on machines and other equipment. Its feature is that it indicates instantly when refilling is required. The unit consists chiefly of a stem, locking spring and grease cup, the latter fitting over the top portion of the stem and spring. One end of the stem is threaded to permit attaching to the unit requiring lubrication. When the cup is filled it slides upward to the upper portion of the stem, sliding down when empty. A safety valve also is incorporated to prevent damage to the cup when a high pressure gun is used in refilling. Readily cleaned, the unit can be adjusted to suit bearing fits and lubrication requirements. It also maintains constant pressure on the bearing, excluding dirt, dust and water.

Industrial Tractor

■ Caterpillar Tractor Co., Peoria, Ill., announces a rubber-tired DW-10 industrial tractor and bottom dump wagon capable of hauling more than 13 tons of earth at 18 miles an hour. Powered by a 90-horsepower diesel engine, the tractor itself weighs 14,500 pounds, and has a tractive effort of 13,000 pounds in low gear, with a loaded wagon.

A quick acting, vertical type governor gives fast pickup. The constant-mesh type transmission has five forward speeds, ranging from 2.4 to 18 miles per hour; and one reverse speed of 3 miles per hour. Engineered for heavy duty hauling, its differential applies greatly increased torque to either driving wheel, should the opposite wheel start slipping.

The braking system consists of

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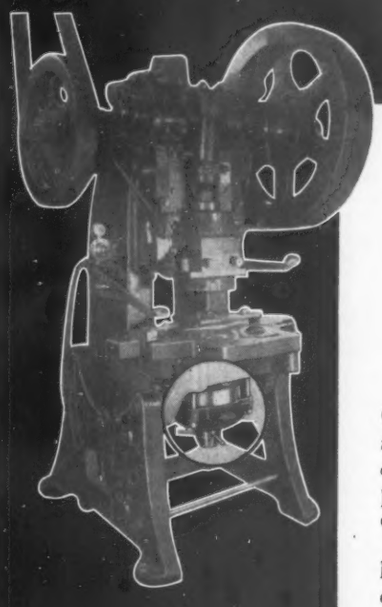

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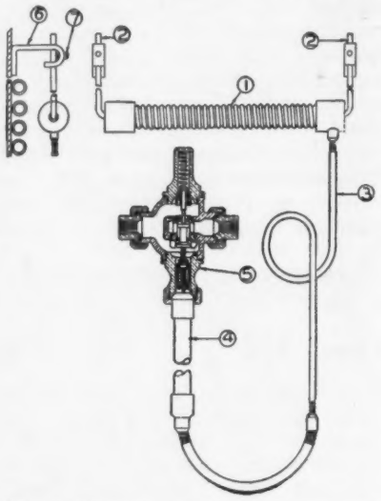
foot-pedal operated, independent, hydraulic brakes for each rear wheel. A level-operated vacuum booster acts on both the tractor brakes and the hydraulic brakes on the rear wagon wheels for stopping the unit. Driver comfort is provided by a full floating seat assembly mounted on a spring. This is adjustable to compensate for varying weights of operators.

The body of the wagon is of the hopper type. It is constructed of pressed shapes formed from plates of special alloy steel, and is of all welded construction. A rear bumper also is provided to facilitate dumping or loading operations where a pushdozer is required. It also protects rear tires. The full length bottom dump doors on the wagon are hydraulically operated from the tractor, and are designed to permit ejection of material at any desired speed.

Temperature Control

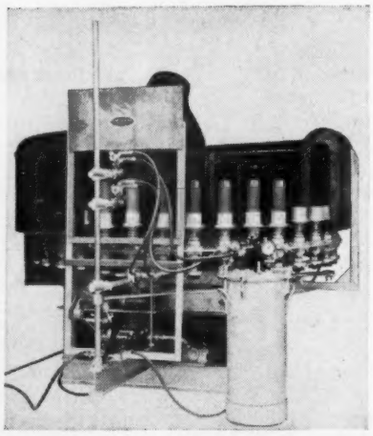
■ Sarco Co. Inc., 183 Madison avenue, New York, has introduced a new vapor line control designed to control the heating medium on degreasers. It maintains automatically the correct vapor line regardless of variations in load and intermittent operation, saving solvent and preventing the formation of rust. The regulator is self-contained and self-operated by a liquid expansion system. Its sensitive bulb or thermostat formed of heavy-wall helically corrugated tubing, exposes a large surface to the influence of the vapor in relation to its content. This results in rapid response to temperature changes. Temperature adjustment is made by



sliding the bulb up or down in brackets until a position is found for the vapor line in the tank. The control is available in sizes ½ to 2 inches for temperatures up to 400 degrees Fahr.

Painting Machine

■ Eclipse Air Brush Co. Inc., 400 Park avenue, Newark, N. J., has placed on the market a special machine for painting projectiles from 37 to 155 millimeter handling each automatically. It consists of a 7-foot indexed turntable with 36 rotating spindles carrying the shell in front of automatic spray guns that are synchronized with the



turntable. After being sprayed, the projectiles are carried through a steam jacketed, tunnel type, drying oven mounted on the table opposite the spray guns. The shell are placed on the table, and removed, manually. The rate of operation is 500 an hour when 6-minute pyroxylin lacquer is used.

SINGLE! DOUBLE! TRIPLE!

--Every type of Herringbone Speed Reducer that you might need

JONES Herringbone Gear Speed Reducers are built in a wide range of ratios and ratings to cover every requirement. Single (Type SH) reducers in standard ratios range from 1.25 to 1 up to 11 to 1 in ratings from 1.3 to 440 H.P. Double (Type DH) reducers are built in standard ratios from 10.9 to 1 up to 72 to 1 in ratings from 0.5 to 275 H.P. The triple reduction reducers (Type TH) cover a range of ratios from 86.9 to 1 up to 355.8 to 1 in ratings from 0.3 to 78 H.P.

All these reducers have heat treated gears, ground shafts and are mounted with anti-friction bearings throughout. Cast iron bases are available for all variations of motor assembly. Liberal stocks are carried to facilitate shipments.

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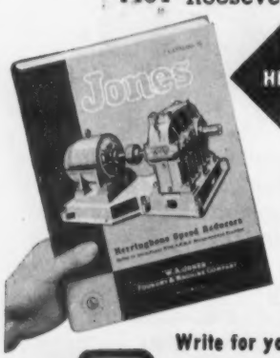

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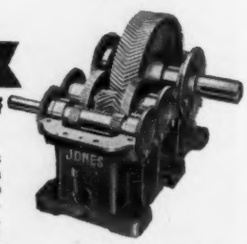

Double Reduction Type DH

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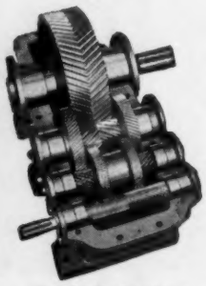


Triple Reduction Type TH

Compression Riveting

(*Continued from Page* 68

sile properties between the axis of the shank of the rivet and a point much nearer the surface of the shank of the rivet—thus that there has been little or no physical change in the shank of the rivet from upsetting. The upset end, however, showed a considerable increase in brinell equivalent, the highest reading being obtained near the point where upsetting or flow was maximum. This, of course, is to be expected as the result of cold working.

In a test to show the effect of the countersink upon the strength of the rivet, a lap joint with two cold-driven rivets and *one head of each ground off flush* with the plate gave a value of 34,200 pounds per square inch when tested in shear. On another test, a lap joint with two cold-driven rivets with *both heads ground off flush* with the plate on both sides, a strength of 27,000 pounds per square inch was obtained. While heads pulled through in both cases, the rivets stood a shear of over twice the maximum value used in calculating the shear strength of rivets.

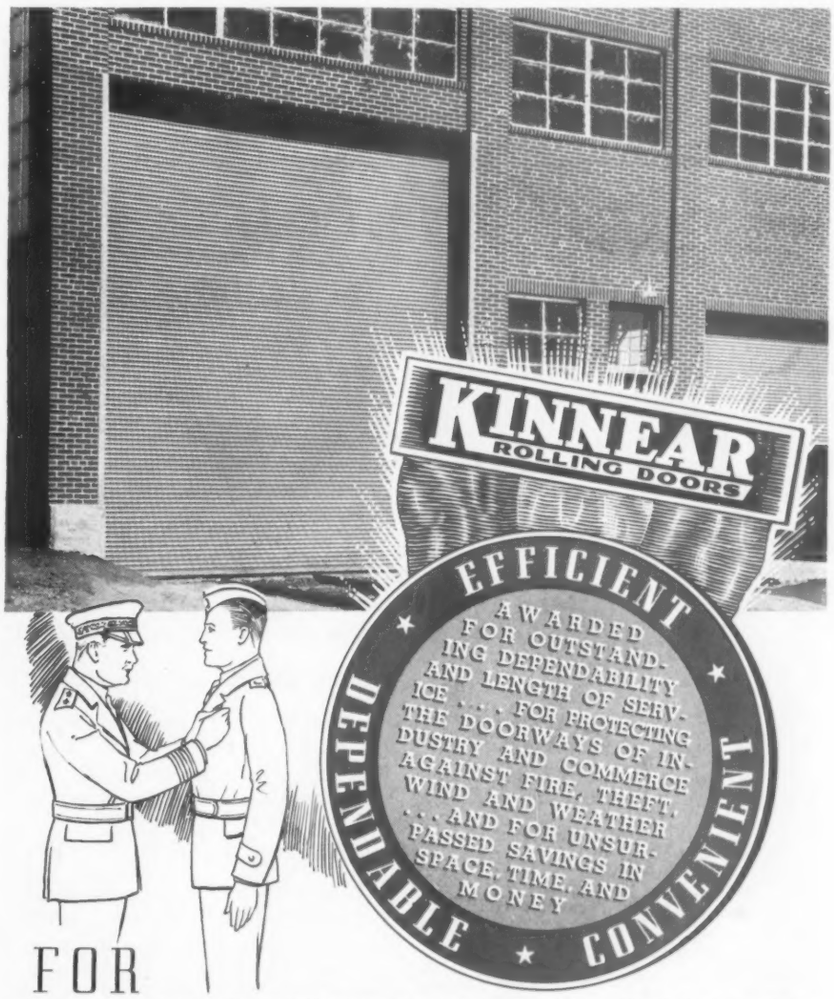
Table IV shows results of double-shear tests of hot and cold-driven rivets made with ¾ and ⅞-inch rivets in test pieces made by joining two ⅝ x 3½ x 11-inch bars butted end to end, with two straps of same dimension, using four rivets. Note that cold-driven rivets annealed gave an average increase in ultimate strength of 2 per cent; unannealed rivets, 24 per cent. Unannealed cold-driven rivets appear to have more friction value due to the greater pressure necessary to drive them, compared with annealed cold-driven rivets.

Table V shows single-shear test results a similar test setup but using a single strap. Note the uniformity of ultimate strength per square inch in the annealed cold-driven rivets. The average increase in strength of cold-driven annealed rivets is 6 per cent; of unannealed rivets, 20 per cent.

Tests Tell the Story: In similar tests on cold and hot-driven rivets in multiple-riveted joints, the cold-riveted joints showed an increase in strength of 94 per cent from the standpoint of slip and failure of the joint by distortion. The final slip was 3/32-inch more in the hot-riveted joint. There was evidently no slip of the cold-riveted joint until the rivets started to shear, so the frictional value of a joint does not enter into calculating the strength of a cold-driven joint, thus eliminating a hard-to-determine variable. This same series of tests substantiated the conclusion that a properly driven cold-riveted joint has a yield strength which is a very high percentage of its ultimate strength. The cold-driven joint shows a 12 per cent higher ultimate strength than the hot-driven joint.

It is interesting to note that in these multiple tests, the actual ultimate strength of the cold-riveted joint of 80,800 pounds was but 600 pounds different from the figured ultimate strength of 81,403 pounds which was derived from the shear strength of a single rivet in a previous test. Thus there is little doubt that all the rivets were giving full shear value to the joint. This is because they fill the hole completely.

It is an interesting fact that the original specification for the rivet rod as to ultimate strength has little to do with the final ultimate strength of the cold-driven rivet. A cold-driven rivet made from a 45,000-55,000-pound tensile rod will show about the same ultimate strength in the driven rivet as one made from a 55,000-65,000-pound rod, or a 58,000-68,000-pound one. According to the American Institute of Steel Construction, this is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to be expected from a theoretical standpoint. It is a valuable characteristic for it allows using the more ductile rivets without sacrifice of strength.

The condition of the pieces of rivet after the test was revealing. Whereas the pieces in the filler bar of the hot-driven joints were shaky and could be moved about with the fingers, the cold-driven joint pieces were all tight and could only be pounded apart with several blows with a heavy bar. This would indicate that cold-driven joints are better for standing heavy strains and distortion. The conclusion drawn from this series of tests on multiple-riveted joints, which incidentally was made by The Pittsburgh Screw & Bolt Co., Pittsburgh, was that cold-driven joints are more dependable and can be figured more accurately than hot-driven ones and that they will withstand accidental abnormal strains without permanent distortion much better.

Shop Practice: Cold driving of rivets has changed shop practice rather radically, permitting increased economy. It has long been known that to get good joints with hot-driven rivets it is necessary to avoid collars between the members. This has required tightly bolting up the steel members to be joined. Often it is necessary to put a threaded bolt in every other rivet hole and to tighten these bolts under heavy pressure. This bolting is not necessary when cold driving. In structural work, only one-half to two-thirds the number of bolts usually necessary is quite adequate for cold driving. In plate work, only one-sixth to one-half the number of bolts need be used. Also, quick acting key bolts may be used to advantage.

A space from ⅛ to 3/16-inch does no harm when driving larger size rivets cold. In fact, it tends to make better work as that much rivet is in the hole where it eventually must go during upsetting.

Many Advantages: Also facilitating the work is the fact that as many rivets as convenient can be placed ahead of the driver. In fact, all rivets in a joint or in a piece may be placed ahead of driving if desired. No longer is it necessary to redrive rivets a number of times to get a tight joint. One quick operation drives as tight a rivet as is possible.

The economies of cold driving are particularly noticeable on work such as large gusset plates, in which it is almost impossible to drive 100 per cent tight rivets when driving them hot, even with much bolting up and redriving. When driven cold, the rivets are all tight with much less fitting up and with the first stroke of the riveter. The only thing necessary is that the holes be accurately in line. A few bolts and a couple of barrel pins are better than a large number of bolts.

Fig. 6 shows a compression riveter cold driving rivets in a roller dam section for the United States government at the plant of the Dravo Corp., Pittsburgh. Some trouble was encountered in getting part of this work tight when hot-driven rivets were used, but no trouble whatever was had with the ones driven cold, although fewer bolts were used.

With exceptionally long grips of five to seven times the diameter of the rivet, nothing much is to be done with hot driving but to take exceptional care and time in driving to prevent rivets from being bent. As anyone knows who has tried it, this is not very successful in producing good rivets, even though they appear satisfactory from the outside. Practically all who have taken the trouble to cut sections of such rivets and examine them admit much is to be desired. With cold-driven rivets, bending can be prevented and perfectly filled holes like that in Fig. 5 can be obtained.

It is evident from the above that cold driving is more economical

(*Please turn to Page* 104)

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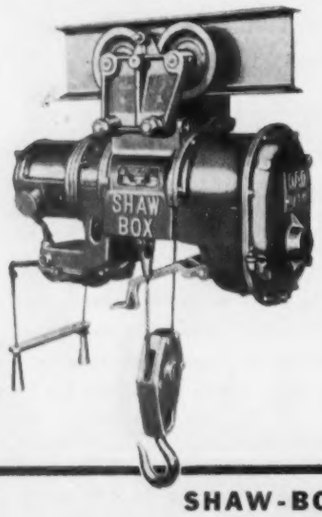

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Better Packaging

(*Concluded from Page 80*)

a predetermined height and dropped in various ways. This was crude but served the purpose.

Then an automatic tester, called the "conbur," was installed. It eliminates the human element and guess work in transportation tests. It was developed by the Freight Containers Bureau of the Association of American Railroads in conjunction with Westinghouse and is shown in Fig. 1. Our test specifications for ranges have been adopted by National Electrical Manufacturers Association and some of the major test laboratories.

Crating 1914 to 1931: The history of packing Westinghouse electric ranges falls roughly into four parts. The first ranges were shipped in heavy open wood crates constructed of thick white pine boards 1 x 3 inches and 1 x 4 inches, as seen in Fig. 2.

The crate had one diagonal reinforcing board and obtained its diagonal strength mainly from three nails in triangular shape. Being open, these skeleton crates did not protect the exterior finish of the range. This design was used from 1914 until 1931.

Crating 1931 to 1935: Then in 1931 the range was bolted to the base of the crate at the corners, and a semitransparent paper bag placed over the range inside the crate.

At this time, however, the range was finished in porcelain enamel with certain parts painted. By adding a diagonal to each of the four sides, it was found possible to reduce the sixe of the lumber. This led to an over-all reduction of 15 per cent in board footage required for crating.

Crate Enclosed in 1935: The paper bag was not moisture proof and frequently was torn, with the result that range arrived dirty so enclosed crates for ranges were introduced in 1935. These kept the product clean and bright. The range was still bolted to the bottom of the crate.

"Floated" in 1936: Floating packing was introduced in 1936 and is used today. Floating packing really was a result of the popularity of porcelain enamel as an over-all finish. With the porcelain enamel range, a new method of packing had to be devised that would keep the range stationary in the package, yet would not wrench or twist the range in handling. This dictated the end of bolting the range to the crate. Floating the range means having it free to move within the crate, not bolting it to the bottom.

Corrugated pads around the range afford a cushion for shocks and hold the range in place. Figs. 5, 6 and 7 show various designs of the full floating package.

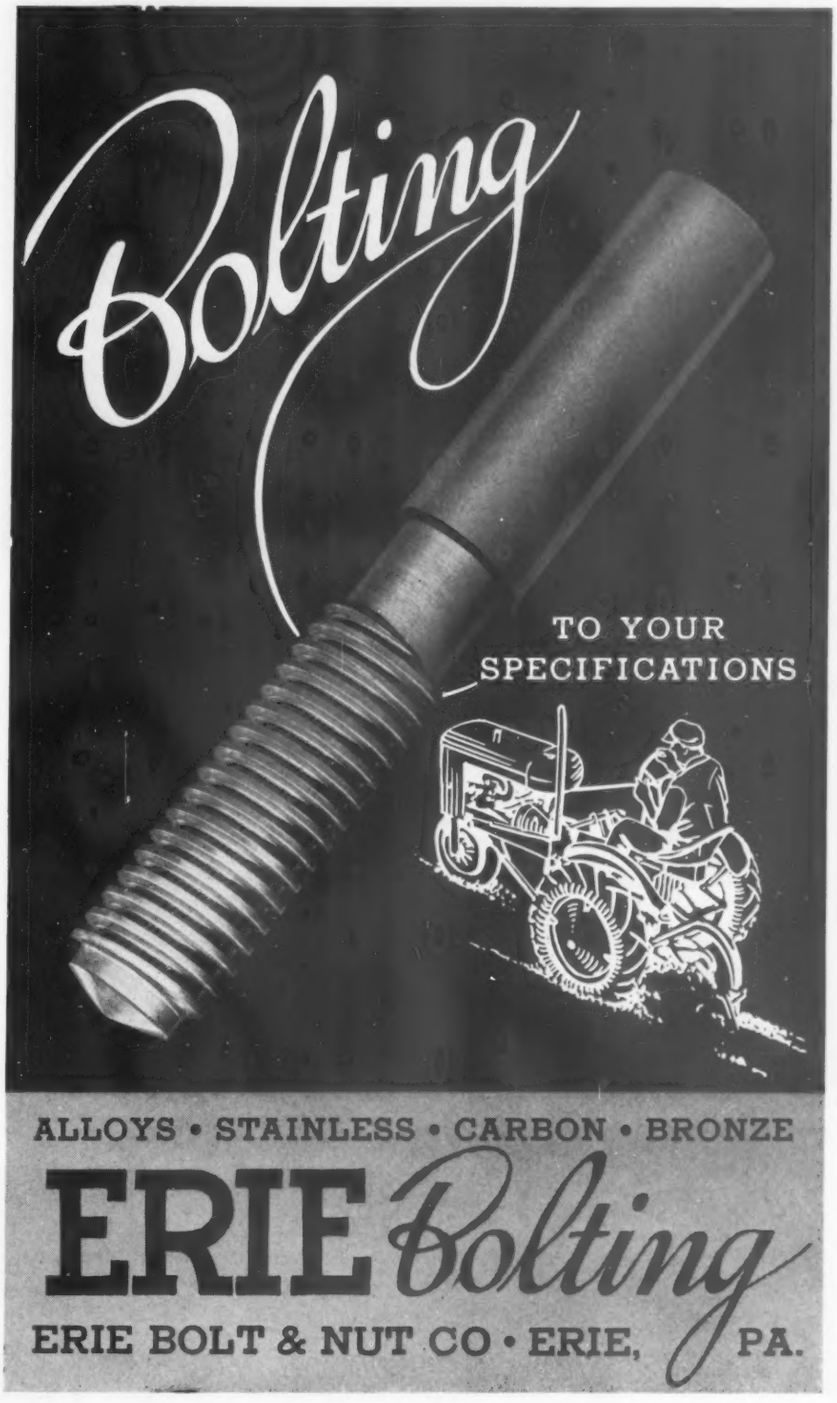
Since the introduction of floating packing, great strides have been made in reducing the cost of the inside packing materials and the container by following our definite program of laboratory tests, transportation tests and assembly experience.

At first, the enclosed crate had 0.120-inch fiberboard panels and 1 x 2-inch wood frame with six cleats on both the top front and back panels.

Our latest development is a crate of similar strength which has 0 100-inch thick fiberboard panels with a special vertical grain cleat 1 13/32 inches wide and with only five cleats on top, front and back panels.

This change saves about 22 cents on each crate—a worthwhile economy.

Does all of this really pay for itself? Our packing engineering has greatly reduced our over-all cost by cutting the number of damaged products received in the field. In addition it has made it possible to slash our packing costs some $86,400 per year when compared with cost of the design used in 1937.



Effect of Nitrogen

(*Concluded from Page 76*)

cyanide bath, but the effect on hardness is not significant compared to that of nitrogen.

The effect of nitrogen in inhibiting softening of the case when tempered is also brought out by the carbon chromium steels in a manner similar to that of the nickel-chromium series. It was consistently noted that the carbon-chromium steel developed the highest maximum case hardness closer to the surface than the nickel-chromium steel, due to the small amount of austenite formed on quenching.

Highest case hardness values were obtained in the sodium cyanide bath. No appreciable amounts of retained austenite were formed, and the carbon content of the case was lower than that produced by the other carburizing medium. After drawing in the 300 to 600-degree Fahr. range, the general case hardness level was higher. This effect was most pronounced with the nickel-chromium steel.

The factors of alloy content, inherent grain size and carbon content all affect the amount of retained austenite formed in the case. It is apparent that the carbon-chromium steel with less alloy content and inherently finer grain size than the nickel chromium steel consistently developed less retained austenite in the case, which resulted in the maximum case hardness occurring closer to the surface. With the coarse grained, more highly alloyed nickel-chromium steel, more retained austenite was formed resulting in maximum case hardness occurring at a greater depth below the surface.

Hardness Noted at the Surface

Hardness determinations on the flat samples in the as-quenched-and-drawn condition showed the surface would need to wear to a depth of a few thousandths of an inch before the full abrasion resisting qualities of the case hardened material would be developed. With the sodium cyanide treated material where no austenite layer is formed, maximum hardness is obtained at the surface.

Thus from the standpoint of automotive gears, the sodium cyanide bath represents the best treatment because of the high hardness developed at the extreme surface. The carbon-chromium steel is generally superior to the nickel-chromium steel as far as surface hardness is concerned, due to formation of less retained austenite.

The temperature range for the decomposition of retained surface austenite was found to be 450 to 500 degrees Fahr. The retained austenite decomposition was more adequately shown by the nickel-chromium steels with high-carbon content and case.

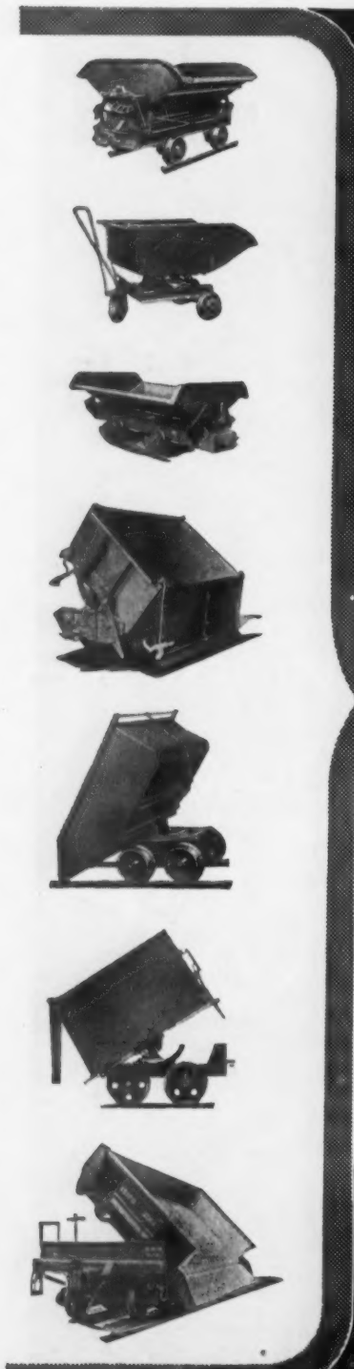
The effect of the low carburizing temperature in producing a high concentration of carbon at the surface was confirmed by chemical and metallographic methods.

Low carburizing temperatures with baths which also introduced nitrogen into the case result in a surface concentration of nitrogen similar to that of carbon. Nitrogen concentration at the surface was more apparent with the 10 and 30-minute treatments.

Recommendations For Cans Now Available

■ Copies of simplified practice recommendation R155-40, "Cans for Fruits and Vegetables," effective from Sept. 1, 1940, are now available for 5 cents each at the office of the superintendent of documents, Government Printing office, Washington, according to the division of simplified practice, National Bureau of Standards.

This publication contains not only a simplified list of recommended can sizes but also a history of the project, a list of the acceptors and the personnel of the standing committee in charge of the maintenance of the recommendation.



More THAN 75 TYPES

OF INDUSTRIAL TRACK AND TRACKLESS CARS

TO SPEED YOUR

DEFENSE ORDERS

More than 75 specific types of industrial cars are production-made to keep initial cost down . . . heavy-duty constructed to give maximum service with least maintenance . . . and each type is designed to do specific jobs faster and more dependably than any other car you could use.

For your track or trackless hauling you will profit by investigating the *Koppel* line of industrial cars. Why not call in a Koppel engineer on your problems *today?*

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PRESSED STEEL CAR CO., INC.
(KOPPEL DIVISION)
PITTSBURGH, PA.

KOPPEL

Purchase of Fencing

(*Concluded from Page* 74)

various localities is the same for each group and hence is not dependent upon method of galvanizing.

The third is that the atmospheric corrosion loss does not follow the Preece test immersion and hence this test is not a test for life of a galvanized article.

Since these facts are self-evident, only one conclusion can be drawn and that is that life of the protective coat of zinc is proportional to the actual weight of equally distributed zinc.

This, then, affects the life as follows: The A.S.T.M. specifications list three classes of galvanized wire. The first has a minimum of 0.030 ounces of zinc per square foot; the second, 0.50; and the third, 0.80.

These classes then would furnish zinc protection for the base metal wire in a farming area, such as State College, of approximately four years, seven years and 11 years, respectively, if the corrosion data previously given is correct.

Price Interest of Consumer

True, there is a difference in the cost of wire purchased on the various A.S.T.M. class specifications, but it is in no means commensurate with the life differential. However, the consumer of fence seldom, if ever, inquires about the quality of fence he is obtaining, but does inquire about a differential of 5 or 10 cents a rod, which difference becomes infinitesimal when applied to the life differential.

Farm fence is not usually manufactured on A.S.T.M. specifications but the farm fence consumer can always attempt to purchase the heaviest coated wire he can obtain for an equal or slightly greater cost, and thus know he is obtaining the most for his dollar.

The third factor is appearance, and this can also be requested. Like a new toy or automobile, the brightness of the article is desired.

Some fences appear bright when purchased, but the method of application of the zinc with its resultant small amount causes the fence to lose its brightness quickly Others by methods of application which give somewhat greater amounts appear dull and gray even when new and they also soon become unattractive; and a third or fourth method produces even heavier coatings which will have an attractive metallic luster which will eventually lose its sheen, but will always remain metallic and white and have an attractive appearance.

To sum up the quantities to be considered, we have the following:

1. Does the base metal of the fence have the greatest corrosion resistance once the protective zinc coat has corroded completely away?
2. Is the base metal of such composition that the zinc adheres sufficiently so that normal distortion of the wire during fabrication does not cause it to crack and peel?
3. Is the amount of zinc on the wire the most that can be obtained without excessive extra cost?
4. Will the fence maintain approximately the same lustrous finish that it has when purchased?

New Film Extends Usage of Keroseal

■ The development of a method of processing Koroseal into a transparent and highly durable film with wide industrial applications is reported by B. F. Goodrich Co., Akron, O. Glass-clear and highly flexible, the film is being produced in gages around one-thousandth of an inch. It is made in a variety of colors in transparent, semitransparent, translucent and opaque forms. In addition, it is water and moisture-resistant. While the chief uses of the film are in waterproofing and packaging materials, its chemical inertness, flame resistance and electrical properties make it valuable for laminating chemical containers for holding acids and corrosives and for insulating fine electric wire and cable, according to the report.

Rule of thumb steel making

COSTS TOO MUCH TODAY

Days when guesswork could be tolerated in a steel mill belong to the past—guesswork costs too much today. Spoilage—lost time and material—inefficient operation—these things rob a plant of profits.

Good steel men no longer depend on a "guess" to control Combustion Conditions in a furnace, an open hearth or a soaking pit. It spoils steel, wastes fuel—cuts down on profits.

Hays Combustion Instruments have set the standard for accuracy, dependability and stamina for 38 years. They are as well known in the steel mills and power plants of the country as a monkey wrench. They can be designed to meet practically any requirement concerning indicating, recording and controlling of combustion conditions. Hays Engineer-representatives are located in all the principal cities to help industry in the solution of its combustion problems. They will be glad to serve you. Write to 960 Eighth Ave., Michigan City, Indiana.

The HAYS CORPORATION
SINCE 1901 COMBUSTION INSTRUMENTS AND CONTROL
MICHIGAN CITY, INDIANA, U.S.A.

ADVERTISING PAGES REMOVED

Originally, boilers in this steam plant were served from the ground floor. Then demand jumped. Additional boilers (plus a plant addition) were considered. The other way was to excavate under existing boilers and thus increase fire box size, heating surfaces, steam capacity. But that raised the problem of removing ashes from the newly-created basement.

This inexpensive Reading Electric Hoist solved the problem in the most economical way. Plant manager states, "Never a repair."

The illustrated book suggests equally satisfactory answers to 144 hoisting problems. Write for your free copy.

READING CHAIN & BLOCK CORP.
DEPT. 33 READING, PA.

READING
Chain Hoists, Electric Hoists, Cranes and Monorails

1940 ASTM Proceedings Now Available

■ The "Proceedings" of the 1940 annual meeting of the American Society for Testing Materials is now available, according to the society headquarters. Embodying some 1400 pages, it includes many important committee reports and appended material presented at the annual meeting, the technical papers and discussions affording valuable data and information on the properties and tests of engineering materials.

Nine of the reports pertain to ferrous metals, including steel, cast iron, corrosion of iron and steel, magnetic properties, malleable iron castings, fatigue of metals, effect of temperature on the properties of metals and iron-chromium-nickel and related alloys. The latter report includes an appended item on inspection of stainless steel architectural structures.

Seven reports involve nonferrous metals including copper and copper-alloy wires for electric conductors, nonferrous metals and alloys, corrosion of nonferrous metals and alloys, electrical-heating, electrical-resistance, and electric-furnace alloys, copper and copper alloys—cast and wrought, die-cast metals and alloys, and light metals and alloys—cast and wrought. Also included are extensive reports covering cement, clay pipe, fire tests of materials and construction, lime, refractories, concrete and concrete aggregates, gypsum, mortars for unit masonry, concrete pipe and manufactured masonry units.

The publication may be obtained from the American Society for Testing Materials, 260 South Broad street, Philadelphia, for $8.50.

Compression Riveting

(*Concluded from Page* 100)

than hot driving both in time and material and at the same time gives more satisfactory results.

Summary: Briefly, the advantages of cold riveting as determined by actual tests and usage can be outlined as follows: Cold-driven rivets are stronger. They are tighter and fill the hole better. They will not jar loose and will stand greater deformation of the work by accident without leaking or becoming loose. They are not subject to cooling strains and shrinkage.

If the contact surfaces are painted, the paint will not be burnt. Fabrication costs are less since the limiting factor in cold riveting is the speed of the riveter itself, and since the rivets are cool they can be handled and placed in the holes quicker.

Fuel bills are less. Fewer rivets are lost. Higher production speed is possible.

Collars cannot form between members being riveted unless excessive space is left between the members to the extent that it is nearly as much as the stock required to fill the hole. The members will always pull together and make tight work unless the space is excessive. This makes it unnecessary to bolt up the work to the extent required with hot driving.

There is no danger of burned or damaged rivets driven in the work.

Shows Role of Machine Tools in America

■ Dealing in great measure with the national defense program and its relation to the machine tool industry, the new 72-page catalog issued recently by R. K. Leblond Machine Tool Co., Madison and Edwards roads, Hyde Park, Cincinnati, presents by means of words and pictures the challenge facing industrial America. Included also is a complete exposition of the company's lathes, automatics, crankshaft machines and gun boring and rifling machines.

Entitled "America Sings," the publication is divided into sections, each of which is introduced by an airbrush "mural" depicting some phase of the American way of life. Each of these then is followed up by technical information on some portion of the machine tool line, tying it in with the "mural" introducing it, illustrating how our lives, both in time of peace and war, are so basically dependent on machine tools.

New Bi-Metal Tubing Retards Corrosion

■ Bi-metal tubing for uses where tubing is subjected to two different types of corrosive attack is now being manufactured by Bridgeport Brass Co., Bridgeport, Conn. It now can be made up in almost any combination of metals or alloys to meet specific requirements. By its method of processing the company has been successful in obtaining a good close contact between whatever materials are used in the composite tube without interfering with the heat transfer where that is needed.

Where Duplex tubes have to be expanded or rolled into a tube sheet, they are supplied with annealed or tempered ends. Although this new tube costs a little more than tubing of one material, by using the correct combination it is often possible to reduce wall thickness, especially where an expensive material had to be used previously. It also is said that the longer life of the tubing compensates for the higher price.

Lend-Lease Bill Passage Implies Greater Steel Need

However first call expected to be for finished armament. Delivery survey shows that five months is about average.

MARKET IN TABLOID ★

Demand
Brisk.

Prices
Steady.

Production
Up 1 point to 98½.

■ PASSAGE of the lend-lease bill means that armament in highly finished forms, such as ships, tanks, airplanes, now will be supplied to Britain in continuously larger volume. Hence, production of such military equipment must be intensified as rapidly as possible; more and more steel and other metals will be required in this direction, with no easement in overall demand in sight.

In view of this outlook, there is considerable encouragement in the fact that deliveries now are not slipping behind at the recent rapid rate. Sales volume is more spotty. Instead of the former steady flow of orders, there are more off days.

A survey of the current steel delivery situation by principal products reveals that with 22 companies which turn out about 85 per cent of the nation's steel five to six months is the most common delivery now available. The greatest extreme is in galvanized sheets, ten months in the case of one company. Plates, right now one of the tightest products, range from three months for one company to seven months in the case of two other makers.

Under the new nickel priorities system, current indications are that nickel and nickel alloys will be shipped only to companies doing defense work. In many cases consumers are able to get along by using substitutes for nickel steels. In many, as in the case of restaurant and hospital equipment manufacturers, the problem of substituting for stainless steels is a serious business worry.

Consumers are forced in many cases to inquire extensively throughout the country in order to pick up a certain gage here, a certain analysis there. A Cleveland consumer, for example, after inquiring from warehouses in sixteen cities, located 3-inch carbon bars in Chicago. Frequently oversize bars must be purchased and turned by the consumer to the required diameter, thus increasing costs. Unable to get alloy steel wire for the manufacture of welding rods, one consumer last week was forced to draw ½-inch rounds down to 3/32-inch wire, involving 17 passes, on his own drawblocks. Resulting cost of the welding rods was about three times what it would be normally.

Under current conditions materials are traveling longer distances. Thus shortage of scrap is to be remedied by bringing material north from out of the way areas, as the Texas oil fields.

There is a growing sentiment against naming steel prices by quarters, a system customary in normal times. Since in the present era there has been no limiting of sales on the basis of the calendar, it is reasoned that prices should be named subject to change without notice, omitting quarters.

On an increasing scale do defense bodies, such as Federal Reserve banks, shop around for steel, using their prestige and influence to get materials delivered where they are needed for defense work.

Usual seasonal demands in tin plate, line pipe and agricultural steel are present in large volume. Tin plate demand has gained most briskly in recent weeks as herein had lain greatest potentialities for increases.

Scheduled automobile production for the week ended March 15 was 131,620 units, a new 1941 high, a gain of 5705 for the week, comparing with 105,720 in the like week of 1940.

The Navy Department bought 105,000 tons of steel for delivery to East and West yards Friday, the first steel purchase connected with the two-ocean navy program. The steel consisted of 69,705 tons of plates, 14,699 tons of structural shapes, 13,387 tons of sheets, the remainder being bars and strip.

Production from a tonnage standpoint reached an all time high last week. On a percentage basis 1 point was added, making 98½ per cent. Gains took place in four districts, Pittsburgh rising 2½ points to 100½ per cent, eastern Pennsylvania by 1 point to 96, Cleveland by 4½ points to 90 and Detroit by 1 point to 93. Three areas dropped, Chicago by 1 point to 99, Buffalo by 2½ points to 90½ and Cincinnati by 6 points to 89. Unchanged were the following: Wheeling at 88, Birmingham at 90, New England at 92, St. Louis at 93 and Youngstown at 97 per cent.

Two of STEEL'S composite price groups advanced, steelworks scrap by 12 cents to $20.08 and iron and steel by 3 cents to $38.29. Finished steel was unchanged at $56.60.

COMPOSITE MARKET AVERAGES

	Mar. 15	Mar. 8	Mar. 1	One Month Ago Feb., 1941	Three Months Ago Dec., 1940	One Year Ago Mar., 1940	Five Years Ago Mar., 1936
Iron and Steel	$38.29	$32.26	$38.23	$38.22	$38.30	$37.07	$33.20
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.50	52.32
Steelworks Scrap..	20.08	19.96	19.91	19.95	21.37	16.47	14.48

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Mar. 15, 1941	Feb. 1941	Dec. 1940	Mar. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.25	2.25	2.25
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.225	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅝-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Mar. 15, 1941	Feb. 1941	Dec. 1940	Mar. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$24.95	$24.34
Basic, Valley	23.50	23.50	23.10	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	24.84	24.34
No. 2 fdry., del. Pgh., N. & S. Sides	24.69	24.69	23.69	23.69
No. 2 foundry, Chicago	24.00	24.00	23.75	23.00
Southern No. 2, Birmingham	19.38	19.38	19.38	19.38
Southern No. 2, del. Cincinnati	24.06	23.56	23.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	25.715	25.215
Malleable, Valley	24.00	24.00	23.60	23.00
Malleable, Chicago	24.00	24.00	23.75	23.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	24.17	24.17	23.35	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melt, steel, Pitts.	$20.75	$20.75	$22.75	$17.05
Heavy melt, steel, No. 2, E. Pa.	18.75	18.50	19.75	15.90
Heavy melting steel, Chicago	19.75	19.25	20.70	15.50
Rails for rolling, Chicago	24.25	23.75	25.00	18.25
Railroad steel specialties, Chicago	23.75	23.55	23.95	18.40

Coke

Connellsville, furnace, ovens	$5.50	$5.50	$5.50	$4.75
Connellsville, foundry, ovens	6.00	6.00	6.00	5.75
Chicago, by-product fdry., del.	11.75	11.75	11.75	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorfed

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 303	No 304
Bars	24.00	26.00	25.00
Plates	27.00	29.00	29.00
Sheets	34.00	36.00	36.00
Hot strip	21.50	27.00	23.50
Cold strip	28.00	33.00	30.00

20% Ni.-Cr. Clad

Plates	18.00*
Sheets	19.00

**Annealed and pickled*

Straight Chromes

	No. 410	No. 416	No. 430	No. 442
Bars	18.50	19.00	19.00	22.50
Plates	21.50	22.00	22.00	25.50
Sheets	26.50	27.00	29.00	32.50
Hot strip	17.00	18.25	17.50	24.00
Cold stp.	22.00	23.50	22.50	32.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.44c
Philadelphia, del.	2.15c-2.30c
Boston, delivered	2.43c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c--2.25c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Roofing Ternes

Pittsburgh base, package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per Pound)	
Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

Base, Pitts.-Cleve.-Chicago Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg $3.85

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

*Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c
Detroit, delivered 2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.70	3300	3.80
2500	2.55	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.20
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.	2.20c

Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown 2.80c

Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	68 off
Do., ⅝ and ⅝ x 6-in. and shorter	66 off
Do., ¾ to 1 x 6-in. and shorter	64 off
1⅛ and larger, all lengths	62 off
All diameters, over 6-in. long	62 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 73-10 off; with nuts attached 73 off; bulk 81 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less	66	70
⅝-1-inch	63	65
1⅛-1½-inch	61	62
1⅝ and larger	60	..

Hexagon Cap Screws

Upset 1-in., smaller 68 off

Square Head Set Screws

Upset, 1-in., smaller	74.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.40c
⅞-inch and under	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel, Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2½"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.)	$2.00
Do., over ⅝ to 41/64-in. incl.	2.15

Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth	
3-12-inch	$52.00
12-18-inch	54.00
18-inch and over	56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$5.00- 5.75
Connellsville, fdry.	5.25- 6.00
Connell. prem. fdry.	6.00- 6.60
New River fdry.	6.50- 7.00
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.85-12.30
Chicago, outside del.	11.00
Chicago, delivered	11.75
Terre Haute, del.	11.25
Milwaukee, ovens	11.75
New England, del.	13.00
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	11.25
Cincinnati, del.	11.00
Cleveland, del.	11.55
Buffalo, del.	11.75
Detroit, del.	11.50
Philadelphia, del.	11.63

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	14.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	13.75c
Do. (1000 lbs. or over)	12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$30.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	23.50–24.50	23.50–24.50	23.00–24.50	25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	23.00–24.50	23.00–24.50	22.50–24.50	24.00–25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	.....	24.66	.....
Boston from Birmingham	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham	24.06	.....	23.06	.....
Cleveland from Birmingham	24.32	.....	23.82	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	26.69	27.69
Newark, N. J., from Birmingham	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, 97c (water); Oakmont, Verona, $1.13; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.12	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo, is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	20.00-21.00
Do. barge	20.00
No. 2 lump	20.00-21.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. $120.00
Ton lots 130.00
Less ton lots 133.50
Less 200 lb. lots 138.00
Do., carlots del. Pitts. 125.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 3 per cent carbon 113.00
2½% carbon 118.00
2% carbon, 123.00; 1% 133.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c
less than 200 lb. lots 12.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot ¼c lb. higher

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c

88% chrome, cont. tons 79.00c
Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.50c
Do., 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50
Ton lots 84.50
Less-ton lots, lb. 4.00c
Less 200 lb. lots, lb. 4.25c
Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c
Ton lots 6.00c
Less-ton lots 6.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., ton 108.00
35-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.22	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	3.90	4.00	4.00	3.95	3.95	5.55	3.65	....	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.12	4.87	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.54	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	3.85	3.85	5.50	4.20	....	5.25	....	6.60	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.25	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	4.65	6.45	4.15	4.15	6.40	4.30	6.50	5.25	....	6.60	10.55	9.80
San Francisco	3.75	4.25	6.00	3.75	3.75	5.60	3.75	6.40	5.40	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	5.25	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b U.K. Ports	£ s d
Merchant bars, 3-inch and over	$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.79c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.29	1 11 4

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£ s d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6 8 0(a)
Basic pig iron	24.28	6 0 6(a)
Furnace coke, f.o.t. ovens	7.15	1 15 6
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23 15 0
Bands and strips, hot-rolled	3.30c	18 7 0††

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate of 15s on certain conditions.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	18.00
Bos. dock No. 1 exp.	17.00
New Eng. del. No. 1	18.00-18.50
Buffalo, No. 1	21.00-21.50
Buffalo, No. 2	19.00-19.50
Chicago, No. 1	19.50-20.00
Chicago, auto, no alloy	18.50-19.00
Cincinnati, dealers	18.25-18.75
Cleveland, No. 1	20.00-20.50
Cleveland, No. 2	19.00-19.50
Detroit, No. 1	†17.00-17.50
Detroit, No. 2	†16.00-16.50
Eastern Pa., No. 1	20.00
Eastern Pa., No. 2	18.50-19.00
Federal, Ill., No. 2	16.50-17.00
Granite City, R. R. No. 1	17.50-18.00
Granite City, No. 2	16.50-17.00
Los Ang., No. 1 net	14.50-15.00
Los Ang., No. 2 net	13.50-14.00
N. Y. dock No. 1 exp.	†16.50
Pitts., No. 1 (R. R.)	21.00-21.50
Pittsburgh, No. 1	20.50-21.00
Pittsburgh, No. 2	19.50-20.00
St. Louis, No. 1	17.50-18.00
St. Louis, No. 2	16.50-17.00
San Fran., No. 1 net	15.00-15.50
San Fran., No. 2 net	14.00-14.50
Seattle, No. 1	15.00
Toronto, dirs., No. 1	12.25-12.50
Valleys, No. 1	21.00-21.50

COMPRESSED SHEETS

Buffalo	19.00-19.50
Chicago, factory	19.00-19.50
Chicago, dealers	17.50-18.00
Cincinnati, dealers	17.00-17.50
Cleveland	20.00-20.50
Detroit	†17.50-18.00
E. Pa., new mat.	20.00
E. Pa., old mat.	17.50-18.00
Los Angeles, net	12.50-13.00
Pittsburgh	20.50-21.00
St. Louis	13.50-14.00
San Francisco, net	13.00-13.50
Valleys	20.50-21.00

BUNDLED SHEETS

Buffalo, No. 1	19.00-19.50
Buffalo, No. 2	17.50-18.00
Cleveland	15.00-15.50
Pittsburgh	19.50-20.00
St. Louis	12.50-13.00
Toronto, dealers	10.00-10.50

SHEET CLIPPINGS, LOOSE

Chicago	15.00-15.50
Cincinnati, dealers	12.50-13.00
Detroit	†13.50-14.00
St. Louis	12.00-12.50
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1.	16.00
Buffalo, No. 1	19.00-19.50
Chicago, No. 1	18.50-19.00
Cincin., No. 1 deal.	14.25-14.75
Cincin., No. 2 deal.	7.75- 8.25
Cleveland, No. 2	14.00-14.50
Detroit, No. 1 new	†16.50-17.00
Valleys, new, No. 1.	20.50-21.00
Toronto, dealers	7.00- 7.50

MACHINE TURNINGS (Long)

Birmingham	9.50
Buffalo	14.00-14.50
Chicago	14.00-14.50
Cincinnati, dealers	10.00-10.50
Cleveland, no alloy	13.50-14.00
Detroit	†11.00-11.50
Eastern Pa.	15.50-16.00
Los Angeles	4.00- 5.00
New York	†10.50-11.00
Pittsburgh	15.50-16.00
St. Louis	11.00-11.50
San Francisco	5.00
Toronto, dealers	†8.75- 9.00
Valleys	15.50-16.00

SHOVELING TURNINGS

Buffalo	16.00-16.50
Cleveland	14.50-15.00
Chicago	14.75-15.25
Chicago, spcl, anal.	15.50-16.00
Detroit	†12.50-13.00
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.50- 9.50
Buffalo	14.50-15.00
Cincinnati, dealers	9.25- 9.75
Cleveland	16.00-16.50
Eastern Pa.	14.50
Detroit	†12.50-13.00
New York	†10.50-11.00
Pittsburgh	17.00-17.50
Toronto, dealers	†8.75- 9.00

AXLE TURNINGS

Buffalo	17.00-17.50
Boston district	†12.50-13.00
Chicago, elec. fur.	20.00-20.50
East. Pa. elec. fur.	19.50-20.00
St. Louis	13.50-14.00
Toronto	†7.75- 8.00

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem.	†10.75-11.25
Buffalo	14.50-15.00
Chicago	14.75-15.25
Cincinnati, dealers	9.25- 9.75
Cleveland	16.00-16.50
Detroit	†12.50-13.00
E. Pa., chemical	17.50-18.00
New York	†11.50-12.00
St. Louis	10.00-10.50
Toronto, dealers	†8.75- 9.00

RAILROAD SPECIALTIES

Chicago	23.50-24.00

ANGLE BARS—STEEL

Chicago	23.50-24.00
St. Louis	21.25-21.75

SPRINGS

Buffalo	25.00-25.50
Chicago, coil	24.75-25.25
Chicago, leaf	23.50-24.00
Eastern Pa.	26.00-26.50
Pittsburgh	27.00-27.50
St. Louis	21.50-22.00

STEEL, RAILS, SHORT

Birmingham	20.00
Buffalo	27.00-27.50
Chicago (3 ft.)	24.00-24.50
Chicago (2 ft.)	24.50-25.00
Cincinnati, dealers	25.25-25.75
Detroit	†22.50-23.00
Pitts., 2 ft. and less	24.00
St. L. 2 ft. & less	23.50-24.00

STEEL RAILS, SCRAP

Birmingham	18.00
Boston district	†15.75-16.00
Buffalo	22.00-22.50
Chicago	19.50-20.00
Cleveland	24.00
Pittsburgh	22.00
St. Louis	19.50-20.00
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	14.50-15.00
Cincinnati, dealers	13.25-13.75

RAILROAD GRATE BARS

Buffalo	14.50-15.00
Chicago, net	14.00-14.50
Cincinnati, dealers	12.75-13.25
Eastern Pa	20.00-20.50
New York	†13.00-13.50
St. Louis	14.00-14.50

RAILROAD WROUGHT

Birmingham	16.00
Boston district	†11.75-12.25
Eastern Pa., No. 1	20.50-21.00
St. Louis, No. 1	14.00-14.50
St. Louis, No. 2	16.25-16.75

FORGE FLASHINGS

Boston district	†13.50-14.00
Buffalo	19.00-19.50
Cleveland	18.50-19.00
Detroit	†16.50-17.00
Pittsburgh	20.00-20.50

FORGE SCRAP

Boston district	†12.75-13.00
Chicago, heavy	24.00-24.50

LOW PHOSPHORUS

Buffalo, plates	26.00-26.50
Cleveland, crops	26.00-26.50
Detroit, thin gage	†19.00-19.50
Eastern Pa., crops	25.50-26.00
Pitts., billet, bloom, slab crops	27.00-27.50
Toronto, dealers	13.50-14.00

LOW PHOS. PUNCHINGS

Buffalo	25.00-25.50
Chicago	24.00-24.50
Cleveland	22.00-22.50
Eastern Pa.	25.50-26.00
Pittsburgh	26.50-27.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	20.00
Boston	†18.50-19.00
Chicago	24.00-24.50
New York	†19.00-19.50
Eastern Pa.	26.00-26.50
St. Louis	21.50-22.00

STEEL CAR AXLES

Birmingham	18.00
Boston district	†20.00-20.50
Chicago, net	25.50-26.00
Eastern Pa.	27.50-28.00
St. Louis	25.75-26.25

LOCOMOTIVE TIRES

Chicago (cut)	23.50-24.00
St. Louis, No. 1	19.50-20.00

SHAFTING

Boston district	†19.50-19.75
New York	†21.00-21.50
Eastern Pa.	25.00-25.50
St. Louis, 1¼-3¾"	19.50-20.00

CAR WHEELS

Birmingham iron	18.00
Boston dist., iron	†16.50-17.00
Buffalo, steel	24.50-25.00
Buffalo iron	20.50-21.00
Chicago, iron	20.50-21.00
Chicago, rolled steel	23.00-23.50
Cincin., iron deal.	19.50-20.00
Eastern Pa., iron	23.50-24.00
Eastern Pa., steel	26.50-27.00
Pittsburgh, iron	22.00-22.50
Pittsburgh, steel	27.00-27.50
St. Louis, iron	21.00-21.50
St. Louis, steel	21.50-22.00

NO. 1 CAST SCRAP

Birmingham	19.50
Boston, No. 1 mach.	†19.00-19.50
N. Eng., del. No. 2	19.25-19.50
N. Eng. del. textile	22.00-23.00
Buffalo, cupola	20.50-21.00
Buffalo, mach.	22.50-23.00
Chicago, agri. net	19.00 19.50
Chicago, auto net	19.50-20.00
Chicago, railr'd net	19.00-19.50
Chicago, mach. net	22.00-22.50
Cincin., mach. deal.	21.50-22.00
Cleveland, mach.	24.00-24.50
Detroit, cupola, net	†19.00-19.50
Eastern Pa., cupola	24.50-25.00
E. Pa., No. 2	22.00-22.50
E. Pa., yard fdry.	22.50-23.00
Los Angeles	16.50-17.00
Pittsburgh, cupola	22.50-23.00
San Francisco	14.50-15.00
Seattle	14.00-15.00
St. L., agri. mach.	19.50-20.00
St. L., No. 1 mach.	20.50-21.00
Toronto No. 1 mach., net dealers	†21.50-22.00

HEAVY CAST

Boston dist. break.	†17.50-18.00
New England, del.	20.00-20.50
Buffalo, break.	18.00-18.50
Cleveland, break, net	18.50-19.00
Detroit, auto net	†19.50-20.00
Detroit, break.	†17.50-18.00
Eastern Pa.	22.50
Los Ang., auto, net	13.00-14.00
New York break.	†17.00

STOVE PLATE

Birmingham	13.50
Boston district	†14.50-15.00
Buffalo	18.00-18.50
Chicago, net	14.50-15.00
Cincinnati, dealers	13.00-13.50
Detroit, net	†13.00-13.50
Eastern Pa.	20.00-20.50
New York fdry.	†17.50
St. Louis	15.00-15.50
Toronto dealers, net	†17.50-18.00

MALLEABLE

New England, del.	22.00-23.00
Buffalo	24.00-24.50
Chicago, R. R.	24.00-24.50
Cincin. agri., deal.	18.00-18.50
Cleveland, rail	25.00-25.50
Eastern Pa., R. R.	23.00-23.50
Los Angeles	12.50
Pittsburgh, rail	25.50-26.00
St. Louis, R. R.	21.50-22.00

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$23.50-24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton, cif.	$43.00-46.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	
So. African, 48%	57.00-60.00
Indian, 49-50%	60.00-63.00
Brazilian, 46%	54.00-55.00
Cuban, 50-51%, duty free	67.50

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 110, 111

Pittsburgh—Backlogs continue to mount as new buying is in undiminished quantity. Output is unchanged. Galvanized sheet rate is off one more point to 73 per cent.

Cleveland — Deliveries still move backward but not as rapidly as previously. Many are out of the market on alloy and coated sheets because of scarcity of raw materials.

Chicago—Sheet consumers are increasing orders and creating another upward surge in mill business. Part of the pressure is caused by unusually heavy requirements of automobile makers. Mills will book business only from regular customers and are alloting shipments on the basis of past orders and known needs, giving precedence to national defense. Some manufacturers can give 20 to 24 week deliveries on hot-rolled, cold-rolled and galvanized sheets, and 4 to 5 months on strip mill sizes; some others can not do so well.

Boston—Mills producing narrow cold strip are frequently revising forward delivery schedules, placing tonnage originally booked for second quarter into third and advancing some from the latter, depending on importance of fabrication in connection with defense contracts. Meanwhile bookings are heavy and maintained ahead of shipments with most orders now being taken for shipment in third quarter.

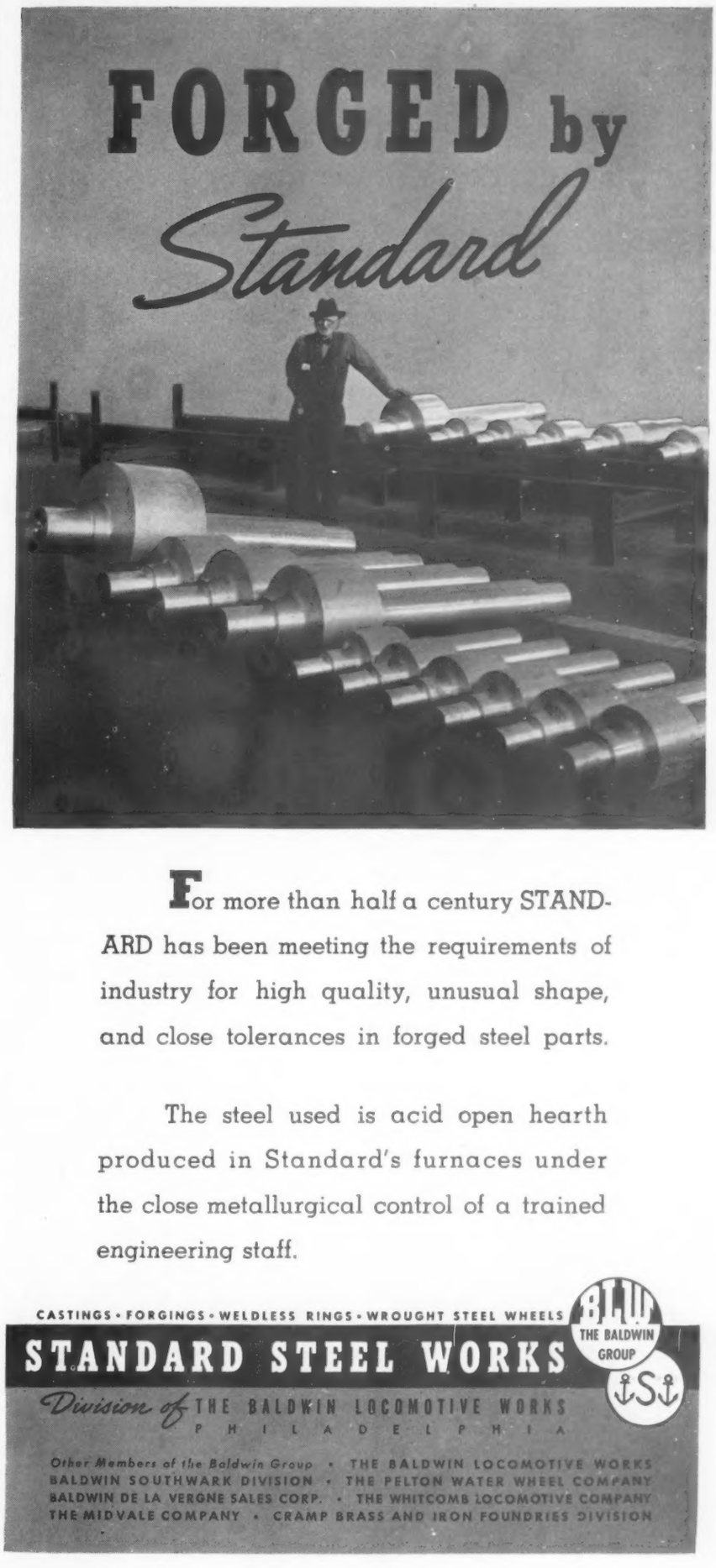
New York — Most sheet sellers can ship little before September, this applying to both hot and cold-rolled and also to galvanized sheets

Narrow cold strip is being booked for third quarter and beyond with mill backlogs growing despite near-capacity operations and heavy shipments. More tonnage is being allocated and rolling schedules are frequently readjusted to meet defense requirements. Price is a negligible factor in forward buying.

Philadelphia—Sheet consumption is brisk as production in the automotive and household equipment industries continues to be stimulated indirectly by growing defense activities. Mills are inspecting all orders closely as some buyers are attempting to build stocks beyond early requirements. Delay in naming prices is causing little concern, the important consideration still being shipments.

Buffalo — Demand for sheet and strip steel has lost none of its strength. A growing number of small consumers are entering the market for material. In addition, automotive manufacturers and partsmakers are still absorbing heavy tonnage.

Cincinnati — Tonnage for third and fourth quarter delivery is be-



For more than half a century STANDARD has been meeting the requirements of industry for high quality, unusual shape, and close tolerances in forged steel parts.

The steel used is acid open hearth produced in Standard's furnaces under the close metallurgical control of a trained engineering staff.

CASTINGS • FORGINGS • WELDLESS RINGS • WROUGHT STEEL WHEELS

STANDARD STEEL WORKS

THE BALDWIN GROUP

Division of THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

Other Members of the Baldwin Group • THE BALDWIN LOCOMOTIVE WORKS
BALDWIN SOUTHWARK DIVISION • THE PELTON WATER WHEEL COMPANY
BALDWIN DE LA VERGNE SALES CORP. • THE WHITCOMB LOCOMOTIVE COMPANY
THE MIDVALE COMPANY • CRAMP BRASS AND IRON FOUNDRIES DIVISION

ing offered sheet mills in undiminished volume. Because of uncertainties, mills have not yet formally booked this forward tonnage. Schedules for second quarter are virtually completed subject to subsequent defense demands. Pressure for automotive material is maintained. Galvanized output has not yet been affected.

Toronto, Ont.—Orders for sheets are heavy and inquiries indicate much greater buying for the future. Mills are now taking orders for delivery towards the middle of third quarter and are fully booked to the end of June.

Plates

Plate Prices, Page 110

Pittsburgh—Some naval specifications on heavier plates have been temporarily held back and more pressure put on lighter armor plate. This results from shift in naval plans, emphasizing construction of destroyers and lighter craft as against rush work on battleships and heavy cruisers.

Cleveland—A Great Lakes shipbuilder inquires for 60,000 tons or more of plates, for use at Cleveland and at a Gulf port plant. Plates probably are the tightest steel item. Under favorable conditions one small producer promises 16 to 18 weeks' delivery.

Chicago—Deliveries on steel plates are extending. Some pinch is being felt for alloy grades, principally nickel. Deliveries of sheared plates range from September to November, an extension of a month, and universal plates are in August-September delivery.

Boston—Orders for steel plates are generally for delivery well into third quarter and mills in some instances are not taking all tonnage offered. Faricators are doing considerable shopping with shipment a factor, but with limited success.

New York—While some sellers offer sheared plates for delivery by Aug. 1, backlogs are becoming increasingly heavy as orders are being entered for delivery over the remainder of the year and in some scattered cases (not including ship steel) beyond.

Navy closed Friday on 105,000 tons of steel, the first inquiry in connection with its two-ocean navy. Included 69,705 tons of plates, 14,669 tons of shapes, 13,387 tons sheets and remainder bars and strip. Plates are mainly medium black, with some high-tensile and galvanized.

Philadelphia—Plates continue in the most critical position of leading steel products as regards supply-demand relationship. Mills see little possibility of early improvement in deliveries and expect a stricter allocation of available tonnage if defense needs are to be fully met. Requirements of shipbuilders are scheduled to expand further the next few months and no lessening in demand in other directions is in prospect.

Birmingham, Ala.—Plate output is at capacity. Backlogs have not declined a great deal and orders are sufficient to assure steady production for sometime. Mills are speeding schedules as much as possible.

Toronto, Ont.—Plate demand is gaining, large orders being closed regularly for shipbuilding. Several thousand tons also are pending in this connection. Tanks and motorized transport vehicles are creating big demand for armor plate, most of which is coming from the United States.

Plate Contracts Placed

1300 tons, first section of penstocks for Pacific Gas & Electric Co., San Francisco, to Western Pipe & Steel Co., San Francisco.

Plate Contracts Pending

Unstated, municipal water storage tank; bids to Moscow, Idaho, March 24.

Unstated, 9164 feet 12 to 48-inch culverts for Alaska Road Commission; bids to purchasing agent, Seattle, March 25.

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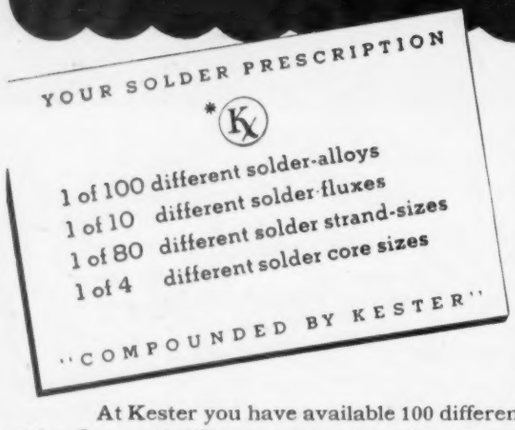
A SCIENTIFIC PRESCRIPTION
for
Soldering Practice in Your Production


YOUR SOLDER PRESCRIPTION
*KX
1 of 100 different solder-alloys
1 of 10 different solder-fluxes
1 of 80 different solder strand-sizes
1 of 4 different solder core sizes
"COMPOUNDED BY KESTER"

Here's a service that may be of vital importance in many operations in your production.

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4222 Wrightwood Avenue, Chicago, Illinois
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KESTER CORED SOLDERS
STANDARD FOR INDUSTRY

Bars

Bar Prices, Page 110

Pittsburgh—Deliveries continue to lag on cold-finished alloy and carbon steel bars, and the hot-rolled picture is virtually unchanged. Earliest delivery on cold-finished now runs well into fourth quarter, while some hot-rolled tonnage remains available for third quarter. There are some gaps in the hot-rolled schedule, left there purposely for rush material in connection with the defense program.

Cleveland—Alloy bars are generally sold through third quarter and carbon bars are not plentiful for that delivery. Demand is still brisk and from diversified sources. Bars are being picked up from storage places here, such as warehouses, and shipped as far as the Pacific Coast for defense.

Chicago—Bar orders are increasing moderately, with demand widespread and well distributed over grades and sizes. Complications regarding alloys are growing, particularly as to nickel, and there is beginning to be some disposition to substitute other compositions where this can be done. Deliveries on carbon bars have been extended from 16 or 18 weeks to 5 or 6 months, and popular sizes of alloy bars from 8 or 10 weeks to 10 or 12 weeks.

Boston—Mounting volume of orders for bars, especially alloys, are for armament and defense needs, on which deliveries will average somewhat better than the general run of tonnage. Buyers with government contracts have placed heavy forward business, which in some instances is being supplemented. Mills are scanning individual orders and considerable readjustments are being made in rolling and processing schedules.

New York—Most leading bar sellers are offering deliveries in 14 to 18 weeks. Only in flats do deliveries appear possible within a few weeks. On the other hand, 2-inch bars and over are being quoted by some sellers at 24 to 28 weeks. Alloy bar schedules, in general, average considerably beyond.

Philadelphia—Second quarter capacity in carbon bars has been absorbed, with third quarter booking accumulating steadily. Until recently some mills had some space open in June schedules, but July or later now is the earliest delivery available. Shipping promises vary with size of material, delays being most acute in alloy material. Consumption is tending upward in production of some defense items.

Birmingham, Ala.—All classifications of bars are in good demand. Concrete reinforcing bars are especially active, although there has been no appreciable let-up in demand for merchant bars.

Buffalo—Bar deliveries are close to schedule but forward buying is heavy. Carbon bookings stretch to the latter part of August or September and alloys to the year end.

Pipe

Pipe Prices, Page 111

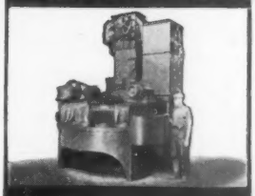
Pittsburgh—Due to a flurry in short line construction general in most sections, backlogs have mounted rapidly on line pipe. In some cases deliveries are not being made as promised. Activity in drill pipe and casing is increasing slightly.

Cleveland—Stocks of merchant pipe in producers' warehouses are still well rounded but show effects of constant drain. Demand is unabated generally, though work for cantonments has slipped a trifle. Demand for line pipe and casings is much better than a month ago, a seasonal development.

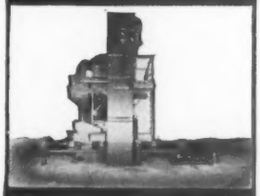
Boston—With mills able to make deliveries on merchant steel pipe around five weeks, secondary sales are improving slowly, with distributors' stocks well balanaced as a rule. Inventories of galvanized

AIR AND AIRLESS BLAST CLEANING

ROTOBLAST BARRELS


ROTOBLAST TABLES

SPECIAL ROTOBLAST


SPECIAL ROTOBLAST

AIR BLAST ROOMS

In this unpredictable year of 1941 every day holds a challenge to our American way of freedom. Each twenty-four hours must be marked by unprecedented production of those things that will make our Nation STRONG.

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The products of the Pangborn Corporation are recognized by both industry and government as vital tools necessary in today's National Defense Program.

•

Blast Cleaning — airless ROTOBLAST and Air — is essential to every metal finishing process in large and small Foundries.

•

Here are pictured the Pangborn blast cleaning and dust collecting "tools" which this very minute are everywhere upping production and lowering cleaning costs as they produce more uniformly finished work than ever before.

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Pangborn engineers, with thirty-seven years of multiple experience to draw upon, know foundry blast cleaning and finishing problems. Their suggestions — tried and proven by hard production jobs such as cleaning munitions and armament, automotive and sanitary ware, castings and forgings, etc.—speak successfully for themselves.

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CASTING WASHER

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WORLD'S LARGEST MANUFACTURER OF BLAST CLEANING AND DUST COLLECTING EQUIPMENT

PANGBORN CORPORATION . . HAGERSTOWN, MARYLAND

are somewhat heavier than usual for this period. Seamless tubing mills are sold well ahead and some can not promise regular accounts delivery before November.

New York—Cast pipe buying is active, notably for defense camp sites, on which foundries are pushed for deliveries. Export buying is also brisk, South America and Panama taking substantial shipments. Atlantic naval and army bases will take large tonnages of cast pipe with inquiries beginning to appear. Utilities are also buying for stock more freely in most instances.

Birmingham, Ala.—Pipe production is steady. Bookings are widely scattered and, for the most part, in small lots. Production is on a five day a week basis.

Cast Pipe Placed

800 tons, 6 to 24-inch, Albany, N. Y., to United States Pipe & Foundry Co., Burlington, N. J.

380 tons, 12 and 16-inch class 150, for Seattle, to Hugh G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

103 tons, 8 to 12-inch, Anaheim, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

1000 tons, approximately 30,000 feet, 12-inch, Dannemora, N. Y., with alternates on steel pipe.

500 tons, various sizes, Staten Island, N. Y., to be bought by contractor.

"This 2-line hook-on bucket, used where 2 hook blocks are available, is especially advantageous because:

It is a simple, rugged design having few parts—maintenance expense is low.

It is very easy for the crane operator to handle in picking up and discharging loads."

Blaw-Knox can meet your exacting requirements in bucket design. Send us your specification without obligation.

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Farmers Bank Bldg. · Pittsburgh, Pa.

Rails, Cars

Track Material Prices, Page 111

Locomotive buying is unusually active, last week's awards being led by fifty 1000-horsepower units and Chicago, New Orleans & Texas Pacific two 5400-horsepower. A fair sprinkling of cars also has been placed.

Supply of rerolling rails is expected to be small this year as many rails displaced by new steel probably will be used for tracks in defense plants rather than thrown on the market. Railroads also are extending sidings in many instances, using relayers instead of selling them. Another factor reducing supply of rerollers is expected delay in delivery of the rails, some rail mill capacity being devoted to defense materials.

Car Orders Placed

American Refrigerator Transit Co., 150 forty-ton refrigerator cars, to own shops in St. Louis.

Central of New Jersey, underframes for 1000 fifty-ton hopper cars, to Bethlehem Steel Co.

Denver & Rio Grande Western, 10 caboose cars, to Bethlehem Steel Co., Bethlehem, Pa.

Wabash railroad, 150 automobile cars, 50 gondolas and 15 caboose cars, to its own shops in Decatur, Ill.

Car Orders Pending

Lehigh & New England, 100 covered hopper cars, bids asked.

Navy, one 10,000-gallon tank car, three 50-ton box and six 50-ton flat cars; bids April 4.

Phelps Dodge Corp., eighty 90-ton air dump cars, bids asked.

Pittsburgh Railways, 100 trolley cars; bids March 17.

Southern Pacific, 2500 cars, 2000 box and 500 miscellaneous, latter reported to be built in own shops.

Stone & Webster, 500 box cars for government TNT plant in West.

Locomotives Placed

Chicago, Rock Island & Pacific, five 44-ton diesel-electric locomotives, to Davenport-Besler Corp., Davenport, Ia.; previously noted as having been placed by the Chicago, Burlington & Quincy.

Cincinnati, New Orleans & Texas Pacific, two 5400-horsepower Diesel-electric freight locomotives, to Electro-Motive Corp., La Grange, Ill.

Southern Pacific, fifty 1000-horsepower, steam locomotives, 40 going to the Baldwin Locomotive Works, Eddystone, Pa., and 10 to the Lima Locomotive Works, Lima, O.

Locomotives Pending

Chicago, Milwaukee, St. Paul & Pacific, one diesel-electric freight engine, re-

ported contemplated.

Navy, department of supplies and accounts, Washington, one diesel-electric locomotive and spare parts, delivery Yorktown, Va.; bids March 21, sch. 5722.

Shapes

Structural Shape Prices, Page 110

Pittsburgh—Wide flange beam deliveries require the longest time of any structural product, with little tonnage available before fourth quarter. Smaller shapes are more easily obtained, with deliveries from ten weeks upward, depending on specifications and tonnage.

Cleveland — Current inquiry and sales are lighter, but much work is in sight. Some fabricators turn down inquiries because of lack of plates to use with plain structurals.

Chicago—Following three weeks of comparative inactivity, bookings of structural steel have improved considerably. At the same time, a number of new projects, mostly small, have come out. Little current work is directly connected with national defense, although numerous plant extensions are indirectly related to it.

Boston—Plain structural shape deliveries are being maintained. Delays in fabricated steel are due almost in every case to lagging engineering details and plans. Except for 4000 tons placed for shipyard shops and additional inquiry for naval stations, activity is slackening, although some lots for industrial plant extensions continue to come out.

New York—First structural steel contracts for the Newfoundland naval base are being placed, with additional plans due out soon. Initial tonnage approximates close to 1500 tons, including steel for a seaplane hangar. Drydock requirements to be estimated soon will take large tonnages.

Philadelphia — Prospective business continues active. Deliveries are extended but have shown no further lengthening and the most severe bulge in demand for various defense projects is believed to have been passed.

Toronto, Ont. — Structural steel fabricators report steady building of backlogs and have orders to keep production at capacity through the year. Awards for the past week were over 9000 tons. War construction projects indicate orders pending of more than 12,000 tons, while for private construction work a further 15,000 tons overhangs the market.

Shape Contracts Placed

1500 tons, crane runways and shipways, Sun Shipbuilding & Dry Dock Co., Chester, Pa., to Belmont Iron Works, Philadelphia, through Raymond Concrete Pile Co., New York.

1460 tons, plant, Cleveland Graphite Bronze Co., Cleveland, to Truscon Steel Co., Youngstown, O.

1400 tons, Ninth Street bridge, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; James McGraw Co., Philadelphia, contractor.

1200 tons, seaplane hangar, naval base, Newfoundland, to Harris Structural Steel Co., New York; Merritt-Chapman & Scott and George A. Fuller Co., New York, joint contractors.

1100 tons, public school 25, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa., through Caristo Construction Co., New York.

925 tons, factory, King Machine Tool Co., Cincinnati, to Indiana Bridge Co., Muncie, Ind., through Ferro-Concrete Construction Co., contractor.

880 tons, addition, Bayside station, Wisconsin Public Service Corp., Greenbay, Wis., to Milwaukee Bridge Co., Milwaukee.

800 tons, Reserve street bridge, St. Paul, state project 5950, to Bethlehem Steel Co., Bethlehem, Pa.; bids Feb. 28.

650 tons, chemical laboratory, Cornell university, Ithaca, N. Y., to Heughes & Co. Inc., Rochester, N. Y., through John Lowry Inc., New York, contractor.

640 tons, spillway for dam, specification 945, Rutledge, Tex., Department of Interior, to American Bridge Co., Pittsburgh.

600 tons, TNT plant buildings, Wilmington, Del., Frazier Brace Inc., to Bethlehem Fabricators Inc., Bethlehem, Pa.

HARD JOBS MADE EASY ON THE DoAll

C. A. Weidner & Sons, Rochester, N. Y. are now able to do highly specialized metal cutting jobs that would be difficult, tedious and prohibitive in cost without their DoAll Machines.

Screw Machine Cams, averaging ⅜" thick and 8" diam. cut on a DoAll at Remington Rand, Inc., Elmira, N. Y.

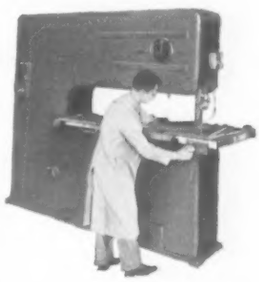
Locking Cam and Cam Stop made of oil hardening tool steel cut directly on the DoAll (no die required) by Taylor Instrument Co., Rochester, N. Y.

SPEED UP **DEFENSE** *WORK*

Time—that's what we're all working against, not only in our defense program, but in regular industrial production. Wherever metal is shaped, cut and used, the DoAll Contour Machine can effect surprisingly large savings in time, labor and material. It's today's indispensable tool.

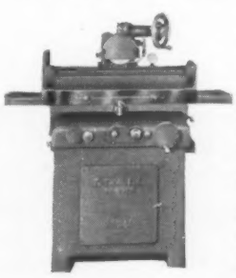
New
MODEL V-60

A brand new model with three 26" wheels, the third one to give it a throat 60" deep. Handles large size and odd shaped metal parts and products.



Four of these are in use at the Canadian General Electric Co.

New DoAll Grinder
with Hydraulic Table Movements



A super precision surface grinder—a real production tool. Less vibration because motor is built right on ball 1-bearing spindle. Work table travel is infinitely variable, up to 50 f.p.m. and has exceptionally large bearing surface.

Investigate the DoAll immediately. Let us send a factory trained man to your plant to show you what a DoAll can do for you.

FREE—Ask for Literature on all DoAll Machines or 158-page Handbook on Contour Machining.

CONTINENTAL MACHINES, INC.
1324 S. Washington Ave. Minneapolis, Minn.

550 tons, addition, York Safe & Lock Co., York, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; Cummings Construction Corp., Baltimore, contractor; also reinforcing bars to same fabricator.

500 tons, factory, Clark Equipment Corp., Buchanan, Mich., Austin Co., Chicago, contractor, to Wendnagel & Co., Chicago.

474 tons, piling, dock, Toledo, O., Standard Oil Co., to Carnegie-Illinois Steel Co., Pittsburgh.

410 tons, state bridge, W. 130th street, Cleveland, to American Bridge Co., Pittsburgh.

410 tons, automotive shop, Aberdeen, Md., Park Iron & Steel Co., Asbury Park, N. J.; Ehret-Day Co., Asbury Park, contractor.

400 tons, girder spans, various locations, Chicago, Milwaukee, St. Paul & Pacific railroad, to American Bridge Co., Pittsburgh.

390 tons, piling, U. S. Coast Guard, Belle Isle, Detroit, Mich., to Carnegie-Illinois Steel Corp.; Great Lakes Dredge & Dock Co., Cleveland, contractor.

383 tons, hangars, Patterson Field, O., J. H. Marchbank Construction Co., Chicago, contractor, to R. C. Mahon Co., Detroit.

375 tons, Holston river bridge, Morristown, Tenn., for TVA, to Nashville Bridge Co., Nashville, Tenn.

363 tons, building, Humble Oil & Refining Co., Baytown, Tex., to Patterson Steel Co., Tulsa, Okla., through Kellogg Co.

358 tons, factory, Woodward Governor Co., Rockford, Ill., Sjostrom Construction Co., Rockford, Ill., contractor, to A. C. Woods & Co., Rockford, Ill.

343 tons, armory, Wisconsin national guard airport, Cudahy, Wis., to Worden Allen Co., Milwaukee.

300 tons, bridge, New York, New Haven & Hartford railroad, Quinnipiac river, New Haven, Conn., to American Bridge Co., Pittsburgh.

260 tons, bridges 180 and 80, Hilliard and Arthur, Mo., Missouri Pacific railroad, to American Bridge Co., Pittsburgh.

250 tons, addition to rotunda building, Ford Motor Co., Dearborn, Mich., to American Bridge Co., Pittsburgh.

230 tons, extension to building 49, General Electric Co., Schenectady, N. Y., to American Bridge Co., Pittsburgh.

200 tons, United States Marine corps base, Paris Island, S. C., to Frank M. Weaver Co., Lansdale, Pa.

175 tons, warehouse, Habirshaw Cable & Wire division, Phelps Dodge Corp., Yonkers, N. Y., to Lehigh Structural Steel Co., Allentown, Pa., through Brown & Matthews Co., New York.

157 tons, addition to machine shop & engine house, Chicago & Northwestern railroad, North Green Bay, Wis., H. A. Peters Co., Chicago, contractor, North Eastern Boiler & Welding Co., Green Bay, Wis.; bids Feb. 18.

150 tons, building, Home for Aged and Infirm Hebrews, New York, to Lehigh Structural Steel Co., Allentown, Pa.

150 tons, additions, branch plant, International Silver Co., Wallingford, Conn., to Topper & Griggs, Hartford; Bethlehem Fabricators Inc., Bethlehem, Pa., to fabricate; H. Wales Lines Co., Meriden, Conn., contractor.

135 tons, plant, General Electric Co., lamp works, Bellevue, O., to Niles Forge & Mfg. Co., Niles, O.

130 tons, Edison office building, Ohio Bell Telephone Co., Rocky River, O., to American Bridge Co., Pittsburgh.

130 tons, state bridge, contract 2126, Wheatland, Porter County, Ind., L-W Construction Co., Chicago, contractor, to Central States Bridge & Structural Co., Indianapolis; bids Feb. 25.

110 tons, bridge caps, various locations, Northern Pacific railroad, to American Bridge Co., Pittsburgh.

100 tons, plant, Upson-Walton, Cleveland, to Burger Iron Co., Akron, O.

100 tons, bridge repairs in Illinois and Indiana, Chicago & Eastern Illinois railroad, to American Bridge Co., Pittsburgh.

100 tons, state bridge contract 2124, Montezuma, Ind., William Scheirer, Frankfort, Ind., contractor, to Midland Structural Steel Co., Cicero, Ill.

Shape Contracts Pending

10,000 tons, 14 government warehouses, Atlanta, Ga.; bids in.

1000 tons, contract 6, Rockaway Beach viaduct; bids March 20, Long Island railroad, New York.

950 tons, state bridge, Whitewater river,

Shape Awards Compared

	Tons
Week ended March 15	14,526
Week ended March 8	16,196
Week ended March 1	34,101
This week, 1940	14,252
Weekly average, 1941	36,160
Weekly average, 1940	28,414
Weekly average, Feb.	27,743
Total to date, 1940	216,217
Total to date, 1941	397,764

Includes awards of 100 tons or more.

DAMASCUS

1906 35 Years 1941

Manganese and Alloy Steel CASTINGS

FROM ½ TO 1000 POUNDS

Produced in our modernly equipped foundry from electric furnace steel and heat-treated in automatically controlled gas-fired furnaces.

We are in position to manufacture specialties made of manganese and alloy steel castings and invite concerns to write us about their requirements.

DAMASCUS STEEL CASTING CO.
New Brighton, Pa.
(Pittsburgh District)

Hamilton county, Ohio.

800 tons, boiler house, government quartermaster depot, Philadelphia; Wark & Co., Philadelphia, contractors.

750 tons, barbette building, Mesta Machine Co., Homestead, Pa.

750 tons, power plant extension, Connecticut Light & Power Co., Devon, Conn.; United Engineers & Constructors Inc., Philadelphia, contractors.

650 tons, manufacturing and assembling plant, Ft. Crook, Nebr., for army engineers.

600 tons, bridge, Grand Central Parkway, New York; bids March 21, Department of Parks.

550 tons, building, Public Service Electric & Gas Co., Burlington, N. J.

525 tons, building 18, navy yard, South Boston, Mass.

500 tons, apartment, East End Avenue, New York.

500 tons, factory building, Standard Steel Spring Co., Gary, Ind.

400 tons, four Illinois state highway bridges; bids March 14.

350 tons, turbine generator foundation, Marion station, Public Service Electric & Gas Co., Jersey City, N. J.

325 tons, warehouse, New York Shipbuilding Corp., Camden, N. J.

315 tons, plant, Clarksburg, W. Va., Pittsburgh Plate Glass Co.; H. K. Ferguson Co., Cleveland, contractor.

315 tons, conveyor bridges and supports, Fort Loudoun dam, Tennessee Valley Authority, Knoxville; bids Mar. 17.

280 tons, two Arkansas state highway bridges; bids March 14.

250 tons, office building addition, National Gypsum Co., Buffalo.

250 tons, manufacturing building, Freehold, N. J.; Steele, Pawnall & Gebhardt, Philadelphia, contractors.

250 tons, miscellaneous steel, storage buildings, La Porte, Ind., for government.

240 tons, building 3, Rheem Mfg. Co., Sparrows Point, Md.

225 tons, building, Remington Arms Co., Bridgeport, Conn.

215 tons, equipment supports, contract 306, Valhalla, N. Y., for New York City.

200 tons, 350-foot crane runway, Bullard Co., Bridgeport, Conn.

190 tons, beam spans, various locations, Missouri Pacific railroad.

175 tons, additions to building, Hamilton Propeller division, United Aircraft Corp., East Hartford, Conn.

165 tons, building, Standard Oil Co. of Indiana, St. Charles, Mo.

150 tons, alterations to dryer building, Wood Conversion Co., Cloquet, Minn.

140 tons, grade crossing, Delaware, Lackawanna & Western railroad, Morris county, New Jersey, for state.

120 tons, buildings, Children's home, Rochester, N. Y., for diocese of Rochester.

115 tons, office and warehouse, Kraft Cheese Co., Cleveland.

110 tons, buildings, Mine Safety Appliances Co., Callery Junction, Pa.

110 tons, repairs to two bridges, Pittsburgh; bids to state highway department, Harrisburg, Pa., March 21.

100 tons, joists, nurses' home, Canton, O.; Robert H. Evans Co., Canton, low.

Unstated, factory addition, Linde Air Products Co., division of Union Carbide Co., Tonawanda, N. Y.

Tin Plate

Tin Plate Prices, Page 110

Pittsburgh—All producers here are booked up at least through second quarter, and in most cases, well into third quarter. Deliveries are being made on schedule thus far, since much of the current tonnage is for delivery later this year, placement being made now merely for protective purposes. Operations are estimated at 80 per cent.

Wire

Wire Prices, Page 111

Pittsburgh—Delivery on many wire products is more reasonable than on most other steel products. Merchant wire items in jobber quantities can be bought from four weeks' delivery upwards, although in other wire products, such as alloy wire rods, deliveries are practically out of sight. In the latter product, there is little available tonnage for this year.

Chicago—Situation in wire shows little change but is extremely tight. Orders exceed productive capacity, and producers are obliged to allot shipments. Production is governed by available semi-finished. Merchant products can be had in four or five weeks and about double that for manufacturer's.

Boston—On only a few products is wire mill capacity open for sec-

1. Precision self-aligning ball bearing.
2. One-piece sturdy housing.
3. Removable end cap.
4. No drag labyrinth seals.
5. Simple mounting wrench.

Send for new 96-page Catalog No. 440 which gives detailed information on the complete Ahlberg line of Ball Bearings, Roller Bearings and Pillow Blocks.

THESE CJB pillow blocks are not a new development, but a proven design, with a ten year service background.

Their compactness and simplicity of design make them ideal for light and normal service, where a reliable yet inexpensive bearing is required.

The full self-aligning, precision type ball bearing, is mounted in a one piece, Parkerized, and accurately machined housing. Seals, to protect the bearing and retain lubricant, are non-wearing Neoprene rings, which turn with the shaft and float in the housing.

This labyrinth type of seal is frictionless, long wearing, and exceptionally effective.

This series is available in shaft sizes from $\frac{5}{16}$" to $2\frac{3}{16}$", in either fixed or expansion types. Closed end type is optional.

AHLBERG BEARING COMPANY
Manufacturers of CJB Master Ball Bearings
3015 West 47th Street - - - Chicago, Ill.

Behind the Scenes with STEEL

Our Friend Again

■ Shrdlu, the office cat at J. T. Bingham Mfg. Co., postcards us to bring along a bushel or two of our *res immateria* the next time we're over East, since their stock is rather low. Naturally we're taking this request *cum grano salis* since she also doubts our squib on metal farming with the facetious remark that the "horse-tail weeds" are more likely horsefeathers instead.

Reno Chain Letter

■ And since we're going to be catty, we may as well tell on our Chicago circulation man who is having a hard time explaining to his little woman why *he* was selected to get this: "This chain was started in Reno in the hope of bringing happiness to all tired business men. Unlike most chains, this does not cost money. Simply send a copy of this letter to five male friends, then bundle up your wife and ship her to the fellow whose name heads the list. When your name works up to the top, you, too, will receive 15,176 georgeous girls. HAVE FAITH, DON'T BREAK THE CHAIN. One fellow did and got his wife back." Naturally, *you* can understand his predicament.

Slip the Dum Dum to Me, Chum

■ And now, by special permission of the Lincoln division of the Ford Motor Co., we are privileged to pass along to you a glossary of quaint argot which the boys on the assembly line toss at each other in their daily jobs of putting those snappy Lincolns together:

Blue goose—Man who makes special deliveries of materials.
Bananas—Bumper guards.
Big Bertha—Custom model Lincoln.
Cheater—Rear-view mirror.
Blinders—Sun visors.
Gingerbread—Outside body trim
The rag—Floor carpet.
Balloon assembly—Rear end body section
Booster—Overdrive.
Dum dum—Sealing material.
Juice Box—Battery.
Pot—Carburetor.
Snort Pipe—Exhaust pipe.
Wrinkle rod—Crankshaft.
Hoop—Tire.
Wind Bag—Inner tube.
Kalsominers—Body finish sprayers.
Bull gang—Group which moves heavy materials.
Greaseball—Chassis lubricator.
Elmer—Straw boss.
"Sky" or S. H.—New employe.

And when the last car of the model year moves off the final assembly line, the boys all crack, "Well, there goes the caboose." So, now, if you hear someone say: "Send a blue goose over for a bunch of bananas and we will get the bull gang to hook up the snort pipes while Elmer spreads the dum dum on these Big Berthas," you will know at once where you are.

Lallygagging

■ We still have one unused and fairly fresh two-bit stogie left over from the quiz a couple of weeks ago. Since we aren't man enough to smoke it ourselves, it is hereby offered free of all charges for the best definition of that bit of modern slang, *lallygagging* used by Kemp's Groucho Marx teacher this week on page 2. And you won't find it in Webster's.

Applause

■ Just as Ann seems just about the same to us now as she did a year ago, we are similarly not particularly aware of the net result of the constant little improvements in STEEL from week to week. We notice it only when we have occasion to dig back in the files for an old copy, which is similar to John Shellenberger's situation. He writes from American Chemical Paint Co., Ambler, Pa.: *Having been away from* STEEL *for a couple of years, I was particularly impressed with the very noticeable improvements you've made, not that it has not always been a good magazine, of course.* Of course.

SHRDLU.

ond quarter delivery and some are booking orders for shipment beyond that period. Backlogs are maintained, incoming tonnage still surpassing shipments and production. Independent mills experience more difficulty in securing rods of some types.

Reinforcing

Reinforcing Bar Prices, Page 111

Pittsburgh—Prices are strong, with new tonnage developing. Rail bar prices in a good many cases carry a differential under billet steel. Analysis of jobs consisting of 100 tons and over during 1940 shows continuation of the trend from jobber to mill in larger jobs.

Chicago—Activity in reinforcing steel materials has increased and numerous jobs have been awarded. Considerable current work has to do with national defense, or for expansions to plants having government orders.

Boston—Distributors of concrete reinforcing bars are more cautious in taking on large orders for future delivery. Although most housing tonnage has been placed, close to 1000 tons remain to be figured.

New York—Active inquiry for concrete reinforcing bars is heavier with purchases led by 1700 tons, highway section, Brooklyn. While most reinforcing steel being bought is for specific projects, drain on nearby stocks to meet smaller orders has been sufficient to keep down inventories. Deliveries are increasingly difficult. Prices are firmer than usual, but scattered shading has not entirely disappeared.

Reinforcing Steel Awards

1700 tons, elevated highway section, contract B-19, Brooklyn, Triborough Bridge Authority, New York, to Fireproof Products Co., New York; Corbetta Construction Co., New York, contractor.

1500 tons, buildings, Curtiss Wright Corp., Franklin county, Ohio; divided between Pollak Steel Co., Cincinnati, and Jones & Laughlin Steel Corp., Pittsburgh; Darin & Armstrong, contractors.

Concrete Bars Compared

	Tons
Week ended March 15	**7,706**
Week ended March 8	**17,722**
Week ended March 1	**7,274**
This week, 1940	**7,686**
Weekly average, 1941	**10,400**
Weekly average, 1940	**9,661**
Weekly average, Feb.	**9,402**
Total to date, 1940	**79,366**
Total to date, 1941	**114,395**

Includes awards of 100 tons or more.

750 tons, shop, Otis Elevator Co., Harrison, N. J., through Walter Kidde Co., New York, contractor.

500 tons, housing project, New Haven, Conn., to Capitol Steel Co., Brooklyn, N. Y., through Lasalla-Mason Corp., New York, contractor.

500 tons, housing project, Providence, R. I., to unstated supplier, through D. M. W. Contracting Co., Brooklyn, N. Y., contractor.

450 tons, sanitary district, Chicago, WPA and other projects, to Olney J. Dean Steel Co., Cicero, Ill.; bids Feb. 27.

405 tons, building, Kohler Co., Kohler, Wis., Permanent Construction Co., Milwaukee, contractor, to Worden-Allen Co., Milwaukee.

400 tons, addition, Florsheim Shoe Co., Chicago, to Inland Steel Co., Chicago.

400 tons, Cramp Shipbuilding Co., Philadelphia, to Concrete Steel Co., Philadelphia.

325 tons, warehouse, Chicago, United Drug Co., to Inland Steel Co., Chicago; E. W. Sproul, contractor.

275 tons, Ninth Street bridge, Washington, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, building, United Aircraft Corp., East Hartford, Conn., to Scherer Steel Co., Hartford.

200 tons, viaduct, Market street, McKeesport, Pa., to Truscon Steel Co., Youngstown, O.; Midwest Construction & Asphalt Co., contractor.

160 tons, building, Atkinson Milling Co., Minneapolis, to Laclede Steel Co., St. Louis; Jones-Hettelsater Co., contractor.

141 tons, Bureau of Reclamation, inv. 32997-A, Tumcumcari, N. Mex., to Sheffield Steel Co., through Capitol Steel & Iron Co., Oklahoma City, Okla.

135 tons, state highway bridge, contract 2127, Gary, Ind., A. C. Rehm, Oak Park, Ill., contractor, to Joseph T. Ryerson & Son Inc., Chicago; bids Feb. 25.

113 tons, mesh, WPA 6 W 1050, airport, Columbus, O., to Ben Tom Supply Co., Columbus, O.

105 tons, addition, hospital building, Fort Devens, Ayer, Mass., to Truscon Steel Co., Youngstown, O.

105 tons, bureau of reclamation, invitation B-46491-A, Kremling, Colo., to Inland Steel Co., Chicago.

100 tons, yard building, naval torpedo station, Newport, R. I., to Concrete Steel Co., Boston.

Reinforcing Steel Pending

7000 tons, alternate, government warehouses, Atlanta, Ga.; A. Farnell Blair, Decatur, Ga., low.

1729 tons, airplane engine plant, Buick Motor division, General Motors Corp., Chicago, also 620 tons wire mesh; bids March 10. Reported last week as 1000 tons bars.

500 tons, quay wall extension, navy yard, South Boston, Mass.; Merritt-Chapman & Scott, contractors.

420 tons, bridge, Grand Central parkway, New York; bids Mar. 21, Department of Parks.

400 tons, plant, Celanese Corp., Narrows, Va.; George F. Hazelwood, contractor.

375 tons, hotel, Jefferson City, Mo.

318 tons, highway projects, Connecticut; bids at Hartford, March 17.

225 tons, mechanical engineering building, Worcester Polytechnic Institute, Worcester, Mass.

200 tons, club house, Newport News Shipbuilding & Drydock Co., Newport News, Va.

190 tons, highway project No. 12, Lake county, Ohio; bids March 25, former bids rejected twice.

175 tons, building, Coca Cola Co., Hartford, Conn.

150 tons, building, Coca Cola Co., Brighton district, Boston.

140 tons, project No. 13, Trumbull county, Ohio; bids March 25, Lombardo Bros. low; previous bids rejected.

130 tons, addition, Illinois Bell Telephone Co., Hyde Park exchange, Chicago.

111 tons, factory, Woodward Governor Co., Rockford, Ill., Sjostrom Construction Co., Rockford, Ill., contractor.

104 tons, bridge, FAP-ZEI, Hartford county, Connecticut; bids March 17.

100 tons, U. S. engineer, New Orleans, inv. 358; bids Mar. 17.

100 tons, state highway bridges and road mats, Springfield, Ill.; bids March 14.

100 tons, dormitory, Trinity College, Hartford, Conn.

100 tons, grade elimination, contract 6, Long Island railroad, Rockaway, N. Y.; bids Mar. 20.

Unstated tonnage, boiler house, government quartermaster depot, Philadelphia; Wark & Co., Philadelphia, general contractor.

Pig Iron

Pig Iron Prices, Page 112

Pittsburgh—Conditions in pig iron are unchanged, with prices steady at quoted levels, and buying active. Despite forecasts of a tighter situation in coke, furnace operators here do not believe a shortage will develop. Numerous beehive ovens are being prepared for operation in case heavier demand develops and this tonnage will probably be ample to take care of any increased blast furnace needs. There is an excellent possibility of a shortage of foundry coke, however.

Cleveland — Sellers still spend most of their time rationing iron equitably and preventing consumers from overpurchasing. Most contracts are now being written in terms of price at time of shipment. Many expect that no distinct second quarter prices will be named. Shipments equal the heavy February rate. Foundries are still receiving sufficient iron.

Chicago—Although the time has come for pig iron sellers to open books for second-quarter business, no action in this direction has been taken. There is no serious shortage of iron. Rather it is a problem of deliveries. Foundries are well covered, but as they increase melt, they frequently need small lots to balance stocks. Unless iron demands increase beyond present expectations, blast furnaces will be able to take care of needs. Coke situation is even tighter than iron, with shipments running several days behind, in spite of full production by by-product ovens.

Boston — While there are some delays in pig iron deliveries, foundries are being supplied with

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enough spot shipments to maintain scheduled operations. Supplies are becoming tight, however, with pressure on merchant sellers increasing. This is notably true of malleable. Melt remains at a high rate. Sellers are not taking second quarter contracts and continue practically to ration the trade.

New York—Eastern pig iron sellers are accepting some business for second quarter delivery at prices ruling at time of delivery. There is no disposition, however, to quote firm prices. Most consumers have tonnage under contract to fill needs for several weeks. Sellers generally will be unable to ship all first quarter tonnage this month, with a resultant carryover into April. One leading interest estimates that most pig iron consumers have enough tonnage under contract for the first two months of next quarter.

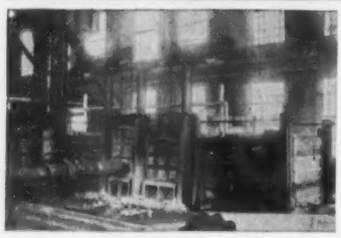
Philadelphia — Prices are a secondary consideration to some pig iron buyers who are interested in covering forward needs. For the present both buyers and sellers are content with the recent practice of naming prices at time of shipment. Inquiries are fairly numerous, including rather frequent requests from foundries seeking to increase nearby shipments. Sellers maintain deliveries reasonably close to schedule but are unable to accommodate additional tonnages except for occasional small lots.

Buffalo—It is believed pig iron producers will not make formal price announcement for second quarter, and will continue to supply regular customers on the basis now prevailing.

Cincinnati—Furnace interests are devoted to supplying actual pig iron needs for established customers, which may even bring about unusual methods. The tight situation may eliminate formal second quarter contract and neither northern nor southern furnaces have opened books.

St. Louis—Pig iron shipments continue at a high rate. In some instances, despite heavy current melting operations, it is believed that reserves are accumulating. As a rule, however, consumer inventories are not large, and blast furnace interests continue to discourage stocking and speculative purchasing. While books for second quarter have not yet been opened, there have been some sales and a fairly large volume of inquiry for that period.

Toronto, Ont.—Demand for merchant pig iron is heavy and gaining in volume, while supply is tight. The melt is moving ahead on war production account. Blast furnace operators are meeting this increased demand, but so far have been unable to supply sufficient iron to offset the shortage of cast scrap.



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Scrap

Scrap Prices, Page 114

Pittsburgh—Chief interest is centered on differentials on various grades of scrap. These are being considered by all factors here, and for the most part, they appear satisfactory. Because Pittsburgh quotations form the base in almost every grade, naturally there is little dissatisfaction on the part of local brokers and dealers. Meanwhile, demand is outstripping supply, and scrap buyers report they are unable to cover all requirements.

Cleveland — Quiet still prevails in iron and steel scrap. Shipments are being made on orders, but supplies are not sufficient to satisfy demands for both steel mill and foundry uses. However, buying is slow, and quotations continue unchanged.

Chicago — Heavy demand and shortage of material have advanced several scrap grades. Several relatively small but significant sales of

No. 1 heavy melting steel to mills are understood to have been made at $20, an increase of 50 cents over the last known sale a month ago. Brokers are obliged to pay this or higher for material to fill commitments. At this price, some improvement in supply is noted. Scrap interests here are not in agreement over the government's suggested differentials below the $21 Pittsburgh base price, and are meeting March 20 to discuss them. Foundry and specialty grades also are tending upward, with consumers willing to pay current prices to obtain needed material.

Boston—Foundry grades of scrap are stronger, dealers and brokers being forced to pay 50 cents to $1 higher to bring out material. Steel works scrap is unchanged for both domestic and export and mills in this district are buying little.

New York—Foundry grades are active and strong, cast having advanced 50 cents, with even sharper increase in stove plate. In addition to the heavy melt this reflects the tight situation in pig iron. Steelworks scrap prices are unchanged, with buying light, most shipments being against contracts with material scarce. Uncertainty prevails regarding pending district and grade differentials and consumers buy little unless pressed for supply.

Philadelphia — Scrap prices are strong despite some uncertainty from government effort to set up stable prices at fixed differentials. Several grades have advanced further, including No. 2 heavy melting steel which has sold at $19, a rise of 50 cents. Dealers are also paying $19 to cover orders. Cast scrap quotations are partly nominal, with premiums offered by some consumers. Mills are believed to be reducing scrap stocks, which have been fairly large from a tonnage standpoint, but light in view of current operations. Dealers expect a small increase on scrap offerings with better weather.

Buffalo — Talk of price differentials has unsettled the market, but sales are reported to confirm prevailing ranges. Steelmaking grades are moving on the basis of $21 to $21.50 a ton. No. 1 machinery cast and stove plate have advanced 50 cents per ton.

Detroit — Pending analysis and discussion of suggested scrap differentials emanating from the price stabilization division of the defense commission, current quotations on scrap are firm. There is a disposition among dealers and broker to co-operate in any way possible with government agencies seeking to stabilize prices, but many inequalities are discerned in the published list of differentials.

Cincinnati—Iron and steel scrap prices are fairly well stabilized. A heavy tonnage in various grades was procured in the last 10 days for application on contracts, a large proportion to be moved by river. Foundry scrap is especially strong.

St. Louis—Iron and steel scrap shows little change except that cast and malleable grades are in urgent demand, scarce and tending upward. Heavy breakable cast has advanced 25 cents per ton to $17.75 to $18.25. Otherwise there was no change in actual quotations, though on some grades, notably railroad specialties, it is doubtful if any sizeable tonnage could be bought at quoted prices. The supply continues to tighten, and brokers experience some difficulty in obtaining material to apply on contracts. Movements to mills is large and consumers are not suffering.

Seattle—Increasing foundry operations have enlarged the scrap market. Cast continues scarce and dealers are trying to meet needs of the navy and other defense agencies and then regular customers. For this reason no further shipments are being made to Canada. Rolling mills are buying steel scrap in large quantities. Prices are unchanged. Receipts are slightly larger but tidewater prices are not particularly attractive to shippers in the interior.

Toronto, Ont.—General conditions in the scrap market shows little change. Machinery cast has brisk demand with supply small and stocks are not sufficient to meet consumers' needs. Steel grades also are in heavy demand and dealers are maintaining good deliveries to mills and electric furnace operators.

Warehouse

Warehouse Prices, Page 113

Pittsburgh — Warehouse supplies are dwindling and some products have disappeared. Among the latter are 1-inch plate above 36 inches in width, and many grades of alloy bars. Increased demand for high carbon products is reported, ostensibly due to the lack of alloy steels.

Cleveland — Steel which should have come to distributors in January is now arriving, on orders placed in October. Buyers and expediters constantly besiege warehouses, with some steel for defense work shipped as far away as Portland, Oreg.

Chicago — Warehouse sales continue to increase, orders exceeding replacement of stock. Business in February was better than January by a wide margin, and March shows a further gain. Chief tightness is in alloy steels, principally those containing nickel, but jobbers have

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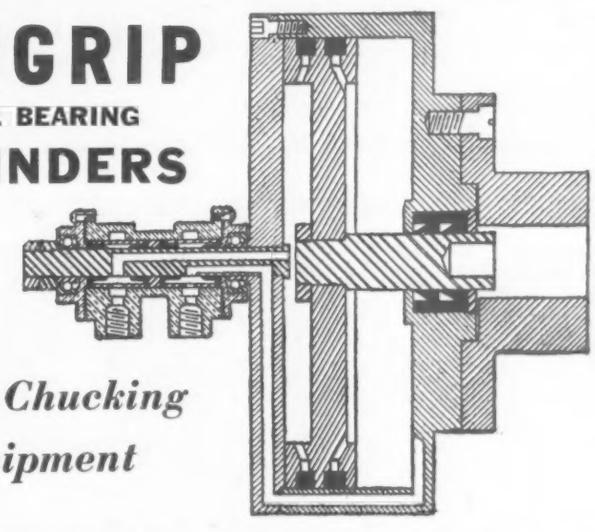

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been able to make substitutions.

Boston—With demand widely distributed as to products, steel warehouse sales are heavy. Demand for plates and most grades of sheets is notably strong and inventories are frequently low. At least one warehouse has advanced quotations on galvanized material, bars, rounds, channels and small bar shapes, about 25 per cent on an average.

New York—Price increases averaging 25 per cent have been made by leading jobbers on galvanized bars, rounds, channels and other light stock. Orders being placed with steel warehouses are heavy, volume being limited in most instances by available inventories and ability to service the trade. While leading jobbers are receiving large shipments of steel against orders placed several months ago, gaps in stocks are frequent.

Cincinnati—Warehouse sales are heavier, and indications now are that sales will surpass January or February. Stocks are fair, with the greatest pinch in structurals, plates and alloy items.

St. Louis—Distribution of steel from warehouses continues heavy, and would be greater except for the scarcity of some items. Demands are well diversified. Most sales, however, are to supply civilian needs.

Seattle—Wholesale houses report steady buying in large volume. Deliveries are not satisfactory as buyers insist orders be filled promptly. Priority is being given to defense items. Sheets, plates, shapes and bars are all in strong demand. Prices are unchanged and firm.

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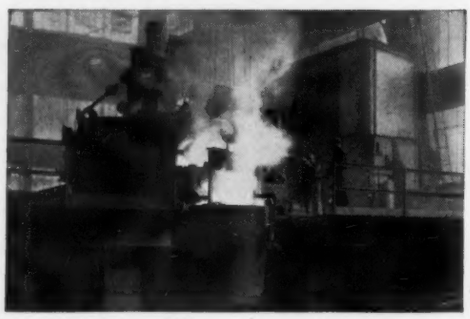

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Die Blocks and Piston Rods

NATIONAL FORGE AND ORDNANCE CO.

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Steel in Europe

Foreign Steel Prices, Page 113

London—(*By Cable*)—The only change in the iron and steel situation in Great Britain is intensification in priority demand, especially in tank and boiler plates and sheets. Production of small structurals and special steels continues intense. Imports of American materials are plentiful. Tin plate exports are greatly limited, owing to limitations on steel supplies.

Maurath Met Demand By Drawing Own Rods

Though unable to get delivery of 3/32-inch nickel-moly wire, despite the fact it was wanted in connection with a defense order, Maurath Inc, manufacturer of welding rods, Cleveland, just has completed shipment of several tons of alloy welding rods. It did this by drawing down ½-inch rods, 12 feet long, on its own draw-blocks. Seventeen passes were required for a reduction to 3/32-inch. The cost of producing the rods in this way was substantially three times the normal cost when the wire can be had from mills.

Ferroalloys

Ferroalloy Prices, Page 112

New York—Ferroalloy sellers generally have re-affirmed prices for second quarter, affecting ferromanganese, spiegeleisen, ferrosilicon, ferrochrome, ferrovanadium, ferrotitanium, alsifer and various other products.

Reaffirmation has applied not only to contract tonnage, but also, so far as can be learned, to spot tonnages. However, little material is available for spot buying, and in some important cases none.

Meanwhile, shipments continue heavy, with the movement in a number of important alloys virtually limited to the seller's ability to produce. Expansion of capacity is going on steadily. Ferromanganese is quotable at $120, duty paid, Atlantic and Gulf ports, and spiegeleisen, 19 to 21 per cent, at $36, Palmerton, Pa.

Equipment

Seattle — Demand for tractors, graders, bulldozers, excavators, shovels and other types of equipment is strong and steady, dealers reporting the largest sales in ten years. Electrical machinery is also moving freely. Bonneville project, Portland, will open bids March 21 for carrier telephone equipment, March 20 for station service cubicles, March 24 for 290 outdoor bus and switch insulators. Bids are in for pumping plant, purifier and other items for Fort Stevens, Oreg., cantonment, Frank Lohse, Astoria, Oreg., low at $47,777 for clarifier, John Helstrom, Astoria, low at $39,177 for low pressure filter and other equipment. J. A. Terteling & Sons, general contractor for the ordnance depot near Umatilla, Oreg., opened bids March 12 for fencing materials including 335,000 feet of barbed wire, gate equipment, etc.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 111

Pittsburgh—Bolt and nut deliveries are now 14 to 16 weeks on small items, for which demand has been heaviest. From that peak, deliveries scale down to almost immediate shipment on some large bolts. Stocks of steel are sufficient although there has been some difficulty in getting alloy rods. In some cases consumers have gone to warehouse buying with satisfactory results so that steel supplies are not critical.

DIED:

THOMAS WILLIAM TURNER, 68, superintendent of foundries, Ingersoll-Rand Co., Phillipsburg, N. J., March 10, in that city. Born in Erith, Kent, England, Mr. Turner came to the United States in 1904 and then went to Canada where for 16 years he was manager of Canadian Allis-Chalmers and General Electric Foundries in Montreal and Toronto. Returning to this country he was for 21 years in charge of Ingersoll-Rand foundries. Mr. Turner was a member, American Foundrymen's Association.

♦

Daniel Peterkin Sr, 67, since 1930 president, Morton Salt Co., Chicago, in that city, March 11.

♦

Richard W. Yeats, 74, president, E. T. Barnum Iron & Wire Works, Detroit, March 6, in that city.

♦

Alexander McNab, 60, president, McNab Naval & Engineering Co. Inc., Bridgeport, Conn., and inventor of various marine safety devices, March 6, near Sanderson, Tex.

♦

William N. McMunn, 61, chairman and president, Michigan Seamless Tube Co., South Lyon, Mich., March 7, at Franklin, Mich.

♦

Henry Leurs, 89, until five years ago secretary-treasurer, American Tool Works Co., Cincinnati, in Cincinnati, March 5.

♦

William E. McCollum, 60, who retired in February as secretary, Central Supply Association, Chicago, in that city, March 7.

♦

Richard H. Uhlmeyer, 75, retired chief engineer, John Deere Harvester Works, East Moline, Ill., at his home in Rock Island, Ill., March 7.

♦

H. A. Pedrick, 78, inventor of machinery equipment, including various portable tools, and until three years ago president, Pedrick Tool & Machine Co., Philadelphia, at State College, Pa., March 5.

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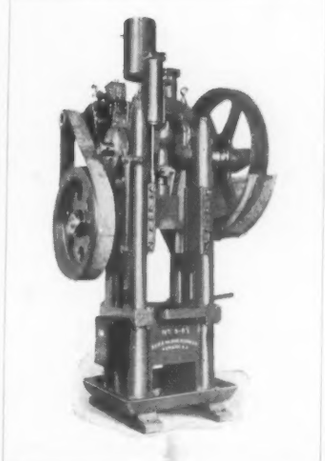

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Nonferrous Metals

New York—It appears probable that the maximum prices will soon be extended to cover all metals and scrap. The administration has acted slowly in setting maximum prices, in the hope that some voluntary solution would develop but this now seems a vain hope. Bernard Baruch, industry czar in 1918, continues to advocate maximum prices and priorities immediately. Government officials continue their efforts to bring about a reduction in scrap metal prices.

Copper — Metals Reserve Co. has bought 235,000 tons of copper and is taking over an additional 20,000 tons to Japan for March, April and May delivery. MRC Latin American copper is moving to domestic fabricators in a stream that may exceed 35,000 tons per month for the remainder of the year.

Lead—Reflecting heavy demand for Mexican, Peruvian and Australian lead, the Mexican refined lead is now up to 3.12c, f.a.s. Tampico, Mex. Scrap prices are tightening up, but there is enough foreign lead available to keep domestic scrap lead prices from equaling or going above the new lead price. It is not often that buyers have their forward needs so well covered. Lead sellers readily dispose of their intakes daily.

Zinc—Producers' operations continue at capacity, but output is still not enough to satisfy all current demand. Leon Henderson's statement this week that 7.25c, St. Louis, price "appears adequate for the foreseeable future" is the first official statement to that effect.

Tin—Sales of Straits tin this past week have been substantial, and all at prices above the 50-cent Metals Reserve Co.'s top buying price. Consumers generally maintain their already substantial tin stocks.

Nonferrous Metal Prices

Mar.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
8	12.00	12.00	12.25	51.62½	51.12½	5.75	5.60	7.25	17.00	14.00	35.00
10	12.00	12.00	12.25	52.00	51.37½	5.75	5.60	7.25	17.00	14.00	35.00
11	12.00	12.00	12.25	51.87½	51.12½	5.75	5.60	7.25	17.00	14.00	35.00
12	12.00	12.00	12.25	51.87½	51.37½	5.75	5.60	7.25	17.00	14.00	35.00
13	12.00	12.00	12.25	52.00	51.50	5.75	5.60	7.25	17.00	14.00	35.00
14	12.00	12.00	12.25	52.00	51.62½	5.75	5.60	7.25	17.00	14.00	35.00

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Sheets

Yellow brass (high) 19.48
Copper, hot rolled 20.87
Lead, cut to jobbers 9.00
Zinc, 100 lb. base 12.50

Tubes

High yellow brass 22.23
Seamless copper 21.37

Rods

High yellow brass 15.01
Copper, hot rolled 17.37

Anodes

Copper, untrimmed 18.12

Wire

Yellow brass (high) 19.73

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York 8.00-8.25
Cleveland 9.25-9.50
Chicago 9.12½-9.37½
St. Louis 8.37½-8.50

Heavy Copper and Wire

New York, No. 1 ..... 9.62½-9.87½
Cleveland, No. 1 ..... 10.00-10.50
Chicago, No. 1 ..... 10.25-10.50
St. Louis 9.62½-9.75

Composition Brass Turnings

New York 7.62½-7.87½

Light Copper

New York 7.62½-7.87½
Cleveland 8.00-8.25
Chicago 8.25-8.50
St. Louis 7.62½-7.75

Light Brass

Cleveland 5.00-5.50
Chicago 6.12½-6.37½
St. Louis 5.00-5.25

Lead

New York 4.75-4.90
Cleveland 4.50
Chicago 4.62½-4.87½
St. Louis 4.25-4.50

Zinc

New York 6.50
Cleveland 5.00-5.50
St. Louis 4.50-4.75

Aluminum

Mis., cast, Cleveland 14.00
Borings, Cleveland 8.50
Clips, soft, Cleveland 16.50
Misc. cast, St. Louis 13.25

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l 13.25
Standard No. 12 aluminum (nom.) .. 19.50

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W. H. A. Robertson & Company, Ltd.—Bedford, England

Week's Government Defense Awards

(*Concluded from Page* 44)

ing strips, $5245.44.

Monarch Machine Tool Co., Sidney, O., machine tools, lathes, $992,601.

National Tube Co., Pittsburgh, seamless or welded steel tubing, $27,097.99.

New Jersey Zinc Sales Co. Inc., New York, plate, slab, sheet zinc, $19,415.19.

Niagara Searchlight Co. Inc., Niagara Falls, N. Y., electric flashlights, $12,067.50.

Northern Pump Co., Minneapolis, motor-driven pumps, $39,884.

Pacific Marine Supply Co., Seattle, portable, gasoline engine driven pumps, $16,316.25.

Pitchometer Propeller Co., Alameda, Calif., bronze propellers, $7550.

Reid Avery Co., Dundalk, Baltimore, welding electrodes, $618,110.

Reiner, John, & Co. Inc., Long Island City, N. Y., generator sets, $32,048.

Saltzman, J. G., Inc., New York, vertical enlargers, $18,608.

Schutte & Koerting Co., Philadelphia, motor-driven pumps, $55,416.60.

Sperry Gyroscope Co. Inc., Brooklyn, N. Y., gyrocompass equipment, $296,346.06.

Vapor Car Heating Co. Inc., Chicago, steam generating units, $33,790.16.

Ward La France Truck Corp., Elmira Heights, N. Y., fire engine, $8315.

Western Gear Works, Seattle, boat crane winches, $44,460.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., main forced draft blowers, thrust bearing segments, $2,092,216.68.

White, I. J., Co., New York, dough mix-

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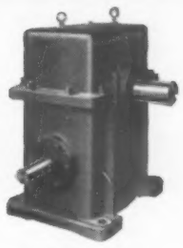

Heavy Duty
Worm Gear Reducer
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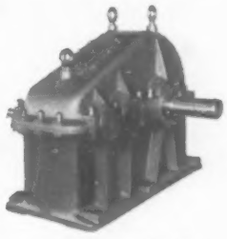
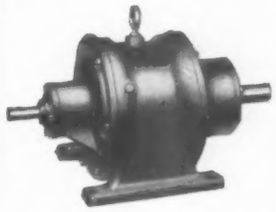
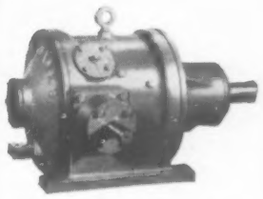
Ratios 6 to 65:1 1/8 to 150 H. P.



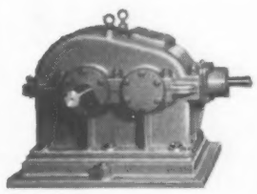
Continuous Tooth
Herringbone Reducer
Single, Double or Triple
Ratios 2 to 350:1 1 to 800 H. P.



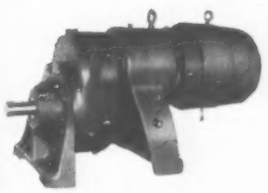
Planetary Gear Reducer
Horizontal or Vertical Drive
Ratios 4 to 1200:1 ¾ to 75 H. P.



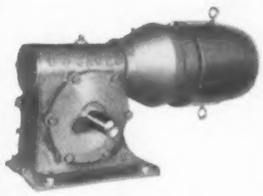
Right Angle Spiral Bevel
Planetary Reducer
Horizontal or Vertical Drive
Ratios 8 to 1200:1 ¾ to 50 H. P.



Right Angle Spiral Bevel
Herringbone Reducer
Ratios 6 to 45:1 2 to 250 H. P.



Motorized Speed Reducer
Horizontal or Vertical Drive
Ratios 1.2 to 9:1 ¾ to 50 H. P.



Motorized
Worm Gear Reducer
Horizontal or Vertical Drive
Ratios 6 to 65:1 1/8 to 50 H. P.

Motorized Speed Reducer
Horizontal or Vertical Drive
Ratios 4 to 1200:1 ¾ to 75 H. P.

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ing machines, $20,476.
Willis, E. J., Co., New York, ship and motor boat bells, $5215.
Wire Rope Mfg. Equipment Co., Seattle, wire, steel rope, $16,920.
Worthington Pump & Machinery Corp., Harrison, N. J., air compressors, $13,948.

Bureau of Yards and Docks Awards

American Sterilizer Co., Erie, Pa., sterilizing equipment at naval medical center, Washington, $31,690.50.
Grover Co., Detroit, alterations to pneumatic system at New York navy yard, $35,620.
Harnischfeger Corp., Milwaukee, bridge cranes at Puget Sound navy yard, Bremerton, Wash., $61,145.
McShain, John, Inc., Philadelphia, exterior services at naval medical center, Washington, $261,800.

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Where Shapes Went in 1940

■ Government work absorbed 44.2 per cent of fabricated structural steel distributed in 1940, according to the American Institute of Steel Construction Inc., New York. This compares with 52 per cent in 1939, and 59 per cent in 1938, the peak for government classification in recent years. In 1936 bridges comprised 33 per cent of total government construction tonnage, with buildings 13 per cent. In 1940 bridges accounted for 22.2 per cent, and buildings 21.0 per cent of federal work.

Industrial buildings led in nongovernmental tonnage, ranging from a low of 14.4 per cent of the grand total in 1938 to 35 per cent in 1940. Railroad buildings were at the extreme low end of the scale, ranging from 0.3 per cent in both 1936 and 1940 to 2.6 per cent in 1937.

Distribution of Fabricated Structural Steel

Sources, by Per Cent

	1936	1937	1938	1939	1940
Government Work:					
Bridges	33.0	26.0	28.0	29.0	22.2
Engineering projects	3.0	2.0	4.0	1.0	1.0
Buildings	13.0	12.0	27.0	22.0	21.0
	49.0	40.0	59.0	52.0	44.2
Railroad:					
Bridges	4.5	2.5	2.6	4.0	2.8
Buildings	0.3	2.6	1.3	0.5	0.3
Industrial buildings	22.5	33.0	14.4	20.0	*35.0
Commercial buildings	8.7	6.7	8.5	11.0	7.0
Institutional buildings	3.0	1.2	2.2	1.5	0.7
Jobs under 50 tons	12.0	14.0	12.0	11.0	10.0
	100.0	100.0	100.0	100.0	100.0

*Some of this work may be financed directly by the government, but if so, it is too uncertain to break down.

Size of Individual Jobs

Per Cent

Under 50 tons	12	14	12	11.5	10.0
From 50 to 500 tons	37	30	35	34.0	29.5
From 500 to 1000 tons	14	13	14	14.0	14.0
From 1000 to 10,000 tons	35	33	34	34.0	39.5
Over 10,000 tons	2	10	5	6.5	7.0

	Bookings	Shipments
1940	1,748,144	1,515,543

Construction and Enterprise

Ohio

AKRON, O.—Akron Gear & Engine Co., 42 East South street, will take bids soon on a one-story plant costing about $40,000.

AKRON, O.—Akron Standard Mold Co., 1624 Englewood avenue, will take bids soon on a one-story plant addition to cost over $40,000.

AKRON, O.—Goodyear Aircraft Corp., subsidiary of Goodyear Tire & Rubber Co., Paul Litchfield, president, will build new aircraft building between Goodyear dock and Massillon road, covering about 500,000 square feet. Company is to make tail surfaces, wings and fuselages, to be assembled with Chrysler motors at Glenn L. Martin plant at Omaha, Nebr.

■ **Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 120 and Reinforcing Bars Pending on page 123 in this issue.**

BLUFFTON, O.—Central Ohio Power & Light Co., Findlay, O., has plans for expansion of its steam-electric generating plant here, including additional equipment, to cost about $700,000.

CLEVELAND—Mitchell Metal Products Inc., Cedar avenue and East Sixty-fifth street, will build new plant at East 222nd street and Nickel Plate tracks, on six-acre tract, three buildings, to cost about $600,000. H. W. Mitchell is president.

CLEVELAND—Cleveland Hobbing Machine Co., 1170 East 152nd street, Carl W. Blossom, president-treasurer, has plans by Fulton & McCreary, 5716 Euclid avenue, for new plant on East 200th street, near Chardon road, 200 x 200 feet. (Noted Feb. 3.)

CLEVELAND—Bailey Meter Co., 1050 Ivanhoe road, has given general contract to J. L. Hunting Co., Ninth-Chester building, for a further plant addition, to cost about $16,000.

CLEVELAND—Gluntz Brass & Aluminum Foundry Co., East 108th street and Harvard avenue, will expand production facilities by occupying space to be vacated by Forker Corp. at 3005 East Fifty-fifth street. Latter will move to 1802 East Forty-seventh street, where 50 per cent larger quarters have been obtained.

CLEVELAND—National Bronze & Aluminum Foundry, 8820 Laisy avenue, John H. Schmeller, president and treasurer, is building its fourth addition in recent months. General contract has been given H. L. Vokes Co., 5300 Chester avenue, for one-story foundry addition 80 x 260 feet, with two monitors and two crane runways.

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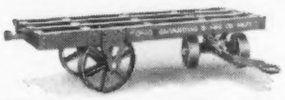

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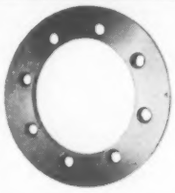

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Enamel Co., 3190 East Sixty-fifth street, is making plans for adding to production facilities in plant recently purchased. John Harris & Co., 203 Plymouth building, is designing new office building, sign shop and furnace.

FOSTORIA, O.—Gillmore Carmichael Olson Co., 1873 East Fifty-fifth street, Cleveland, has been given cost-plus contract for $1,000,000 government gas mask charcoal plant, to be operated by National Carbon Co., New York.

NORTH BALTIMORE, O.—Village has plans for a municipal power plant with diesel engine generating units, costing about $210,000. C. J. Simon & Associates, Evans-Central building, Van Wert, O., are engineers.

ORRVILLE, O.—Will-Burt Co., B. G. Cope, president, manufacturer of power plant electrical controls, Main street, will build one-story addition 40 x 50 feet, equipped with electric or chain hoists and trolleys for materials handling.

SHELBY, O.—Auto Call Co., Tucker avenue, J. R. Harrington, general manager, has plans for one-story additions 32 x 78 feet and 64 x 160 feet. Harry J. Brumenshenkel, Walpark building, is architect.

Connecticut

GREENWICH, CONN.—Building committee, Greenwich Hospital association plans erection of a powerhouse in connection with new five-story hospital, entire project to cost about $1,000,000. Crow, Lewis & Wick, 200 Fifth avenue, New York, are architects.

HARTFORD, CONN.—Hartford Electric Light Co., 266 Pearl street, is having plans prepared for an addition to its steam-electric generating plant at South Meadows, including 45,000-kw turbo-generator unit, high-pressure boilers and auxiliaries. Stone & Webster Engineering Corp., 49 Federal street, Boston, is engineer.

NEW HAVEN, CONN.—National Folding Box Co., James and Alton streets, plans to build a one-story 52 x 250-foot plant costing about $55,000. Fletcher-Thompson Inc., 1336 Fairfield avenue, Bridgeport, Conn., is engineer.

STRATFORD, CONN.—Raybestos division Raybestos-Manhattan Inc., East Main street, has plans for a one-story 60 x 360-foot plant to cost about $75,000.

WALLINGFORD, CONN.—International Silver Co., 48 State street, Meriden, Conn., has let general contract for one-story 140 x 150-foot and two story 30 x 80-foot additions to H. Wales Lines Co., 134 State street, Meriden, at about $90,000.

Massachusetts

HUDSON, MASS. — LaPointe Machine Tool Co., Tower street, has let general contract for a one-story 20 x 160-foot assembly building to J. J. Prindiville Co., Concord street, Framingham, Mass., to cost about $45,000.

PITTSFIELD, MASS.—Berkshire Woolen Co., Pecks road, has plans for a powerhouse costing about $130,000, including boilers and auxiliaries.

New York

FARMINGDALE, N. Y.—Republic Aviation Corp., Conklin street, has let general contract for a one-story 64 x 82-foot boilerhouse to Turner Construction Co., 420 Lexington avenue, New York, to cost about $50,000. Albert Kahn, New Center building, Detroit, is engineer.

New Jersey

HILLSIDE, N. J.—Copper Alloy Foundry Corp., 154 Broadway, Elizabeth, N. J., has let general contract for a one-story 75 x 120-foot foundry addition on Ramsey avenue. J. DiStasio & Co., 17 Liberty street, New York, are engineers.

NEWARK, N. J.—Eisler Engineering Co., 760 South Thirteenth street, has let general contract for a one-story 50 x 100-foot welding machine shop to F. Franco, 269 Lafayette street.

PERTH AMBOY, N. J.—Welin Davit & Boat Corp., 500 Market street, has plans by C. C. Porter, 30 Blackburn road, Summit, N. J., for a one-story 70 x 240-foot plant on Market street.

Pennsylvania

BRIDGEVILLE, PA. — Flannery Bolt Co., L. H. Lloyd in charge, has let general contract for a one-story 120 x 150-foot addition to Pittsburgh-Des Moines Steel Co., Pittsburgh.

EASTON, PA.—C. K. Williams & Co. Inc., North Thirteenth street, manufacturer of chemicals and colors, is having plans prepared for a steam power plant, including boilers and accessories, to cost about $125,000. Lockwood Greene Engineers Inc., 10 Rockefeller Plaza, New York, is engineer.

Michigan

BENTON HARBOR, MICH.—Covel Mfg. Co., 280 North Shore drive, has been incorporated with $100,000 capital to manufacture machinery and castings, by Eddie C. Filstrup, 260 Ridgeway street, St. Joseph, Mich.

CRYSTAL FALLS, MICH.—Wisconsin-Michigan Power Co. has been given permit by Iron county supervisors to build three hydroelectric plants and dams, to cost about $3,500,000.

DEARBORN, MICH.—Dearborn Tool & Die Co. has given general contract to C. W. Clark, Dearborn, for a factory building costing $16,000. H. L. Lilley, Dearborn, is architect.

DETROIT—Ex-Cell-O Corp. has given contract to the Austin Co., Detroit, for a plant addition 60 x 440 feet, to cost $80,000.

HASTINGS, MICH.—Village has plans for a municipal power plant, including diesel engine generator units and accessories, costing about $145,000. Francis Engineering Co., Saginaw, Mich., is engineer.

JACKSON, MICH.—Consumers Power Co., Dan E. Karn, vice president, will spend about $14,000,000 on expansion and improvements to facilities in 1941.

JACKSON, MICH.—Frost Gear & Forge division of Clark Equipment Co. will build a one-story 150 x 300-foot addition costing about $100,000. (Noted Feb. 17.)

MARYSVILLE, MICH.—Detroit Edison Co. will spend about $7,000,000 for expansion and improvements of its plant here, including additions to turbine room, boiler room and coal dock.

PONTIAC, MICH.—Pontiac Appliance Co., 2260 Scott Lake road, has been incorporated to do metal work, with $60,000 capital, by Victor E. Nelson, 127 Illinois avenue.

WYANDOTTE, MICH.—City council has approved plans for addition and improvements to municipal light and power plant, including new steam boiler, to cost about $500,000. Burns & McDonnell Engineering Co., Kansas City, Mo., is engineer. (Noted Jan. 13.)

Illinois

CHICAGO—Oak Mfg. Co., 1260 North Clybourn avenue, manufacturer of radio parts, is building an addition covering 12,000 square feet floor space, at cost of about $20,000.

CHICAGO—Rock-Ola Mfg. Co., 800 North Kedzie avenue, manufacturer of phonographs and scales, has built a one-story addition covering about 6000 square feet to increase facilities for production of airplane parts for defense.

CHICAGO—Borg-Warner Corp., 319 North Albany avenue, has let contract to Enjay Construction Co. for a new plant for its spring division, 50,000 square feet, to cost about $300,000, with equipment.

CHICAGO—General Finishing Laboratories, 900 North Spaulding avenue, metal finisher, will build a $15,000 one-story plant at Kolin and Chicago avenues, covering about 9000 square feet, 2000 feet more than now available.

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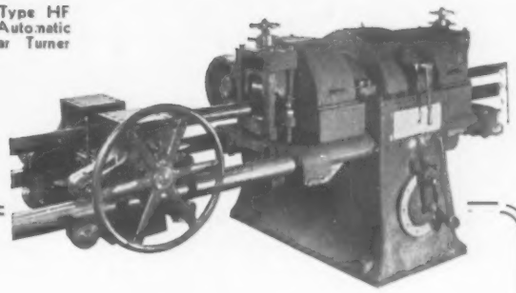

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PITTSBURGH, PA.

Inc., 1812 West Hubbard street, manufacturer of chromium-plated steel furniture, has bought plant and machinery of Case Electric Corp., Marion, Ind., to enlarge production, continuing operation of its Chicago plant.

DECATUR, ILL.—Model Brass Co. Inc., 232 East Decatur street, valve manufacturer, is building one-story 60 x 80-foot plant addition, to double production facilities.

ROCK ISLAND, ILL. — Construction will be started soon on forge and heat treating plant and military warehouse at Rock Island arsenal, the latter to be one of largest military units in United States. Bids will be taken March 31 for forge and heat treating plant and March 27 for clearing site for warehouse.

Indiana

FORT WAYNE, IND.—Wayne Paper Box & Printing Co., Superior and Calhoun streets, will install electric equipment in a four-story addition 70 x 115 feet, to cost $100,000. Pohlmeyer & Pohlmeyer, Central building, Fort Wayne, are architects.

INDIANAPOLIS — Hoosier Foundry Inc., 1022 East Michigan street, has been incorporated with 1000 shares no par value to manufacture castings, by Edward Workman and associates.

MARION, IND.—Peerless of America Inc., R. Kritzer, president, Spencer avenue, is reconditioning and re-equipping buildings for manufacture of air-conditioning equipment, at cost of $100,000 or more, with equipment.

PLYMOUTH, IND.—Argos Foundry Co., William Schlosser, owner, suffered fire loss, core and pattern departments most severely damaged.

WABASH, IND.—G. M. Diehl Machine Co., F. A. Collinge, manager, 981 South Wabash street, is remodeling a one and two-story plant and boiler house at cost of about $50,000. Lennor & Matthews, Architects and Builders building, Indianapolis, are engineers.

Kentucky

LOUISVILLE, KY.—National Carbide Corp., 603 East Forty-second street, New York, will build a plant to manufacture calcium carbide and acetylene gas on a 60-acre site, at cost of about $1,000,000.

LOUISVILLE, KY.—Louisville Gas & Electric Co. plans a steam-electric generating station on the Ohio river, including large turbo-generator units, high-pressure boilers and auxiliaries, to cost about $5,500,000.

Georgia

MACON, GA.—Navy department will double capacity of fuse loading plant recently announced to cost $2,000,000. Second unit increases cost to $5,000,000. Additions call for 80 buildings and five miles fence. Will be operated by Reynolds Corp., 200 Southern building, Washington.

Tennessee

CHATTANOOGA, TENN. — Columbian Iron Works, 2501 Chestnut street, has leased additional plant and will expand at cost of $188,000, including additional equipment for production of shells.

CHATTANOOGA, TENN. — Tennessee Products Corp. will build addition to its coke by-products plant here, doubling capacity, at cost of about $1,800,000. Part of added supply of coke will go to Alcoa, Tenn., plant of Aluminum Co. of America.

Wisconsin

GREEN BAY, WIS.—Northwest Engineering Corp., manufacturer of shovels, cranes, draglines, plans plant addition, including extension of structural shop and paint spray room.

GREEN BAY, WIS.—Wisconsin Public Service Corp. will take bids about April 1 for a power plant addition costing about $2,600,000, including equipment. A. G. Carson, Green Bay, care owner, is chief engineer. (Noted Feb. 3.)

GREEN BAY, WIS.—Chicago & North Western railroad, B. R. Kulp, chief engineer, 400 West Madison street, Chicago, has given general contract to H. A. Peters Co., 19 South La Salle street, Chicago, for a one-story machine shop addition 100 x 150 feet. (Noted Jan. 27.)

KAUKAUNA, WIS.—Kaukauna Machine Corp., W. H. Roloff, general manager, manufacturer of gray iron castings, will build a one-story addition 60 x 80 feet. Raymond N. LeVee, Appleton, Wis., is architect.

MILWAUKEE—Artos Engineering Co., manufacturer of automatic cutting and stripping machinery, will build a one-story plant addition.

MILWAUKEE—Nordberg Mfg. Co., manufacturer of engines, compressors, etc., has given general contract to Austin Co., 510 North Dearborn street, Chicago, for eight factory buildings. (Noted Feb. 10.)

PHILLIPS, WIS.—Price electric cooperative, Frank X. Schumacher, secretary, will open bids March 20 for 377 miles of rural transmission line and one substation. REA has allotted $336,000 for project. Wisconsin development authority, Tenney building, Madison, Wis., is engineer.

RACINE, WIS.—Belle City Malleable Iron Co. has given general contract to Nelson & Co. Inc. for alterations and improvements to its plant. Ellis A. Klinger is architect.

SHULLSBURG, WIS.—City plans construction of municipal light and power plant and is asking estimates from diesel-generator manufacturers.

South Dakota

SIOUX FALLS, S. DAK.—Standard Oil Co. has been given permit to construct 2,000,000-gallon capacity oil storage plant in South Sioux Falls, at northern terminus of proposed pipe line from Council Bluffs, Iowa.

Iowa

CRESCO, IOWA—City has awarded general contract for light and power plant to Stolz Construction Co., New Hampton, Iowa, at $55,645. Hubbard Engineering Co., 415 North LaSalle street, Chicago, is engineer. (Noted Feb. 17.)

Oregon

PORTLAND, OREG.—Steel Pipe & Tank Co. is rebuilding rolling mill and other departments recently damaged by fire.

Washington

SEATTLE—A. F. Ederer Engineering Co., 2945 First avenue South, will build craneway addition to its plant, costing about $4000.

SEATTLE — Roberge Sheet Metal Works, 1122 Post street, is expanding its plant and adding equipment to care for army and navy contracts.

SEATTLE—Clough Equipment Service Co., 2710 Sixth avenue South, will build a truck body plant 100 x 120 feet, with galvanized steel siding and steel sash.

Canada

SARNIA, ONT.—Electric Auto Ltd., Christina street North, will build $70,000 plant here, general contract to Robert McKay, 291 Milton street.

SAULT STE. MARIE, ONT.—Algoma Central & Hudson Bay railroad will rebuild burned car shops at cost of about $200,000.

LACHINE, QUE.—Canadian Wire Rope Co. Ltd., Aberdeen avenue, has let general contract to Foundation Co. of Canada Ltd., 1538 Sherbrooke street, Montreal for plant addition to cost $50,000. Shennan & Copeman, 606 Cathcart street, Montreal, are architects.

VILLE ST. LAURENT, QUE.—Noorduyn Aviation Ltd., 1411 Crescent street, Montreal, will build addition estimated to cost $2,000,000. L. A. & P. C. Amos, 133 Commissioners street West Montreal, are architects.

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ADVERTISING PAGES REMOVED

Comments FROM... STEEL's Readers

Pays for Suggestions

To the Editor:

Apropos of the short item in STEEL, Feb. 17, 1941, page 27, relative to General Electric paying $77,477 to 11,510 employes in 1940 for helpful suggestions, is the following description of a similar plan outlined in the January issue of *Westinghouse Magazine*, which I recently ran across:

"Thirty years ago Westinghouse put into practice a suggestion plan giving employes an opportunity to realize a premium on their ideas for cutting production costs, increasing sales, improving efficiency and promoting safety. The summation of these three decades of suggesting, is both a tribute to the ingenuity of thousands of successful suggesters and a note of inspiration for thousands of other employes to do likewise.

"During the period in which the suggestion plan has been in operation, nearly 30 per cent of the more than 81,000 suggestions received have been adopted by the company. These have resulted in reducing production costs more than $800,000, and have brought awards totaling more than $166,000 to their originators.

"Many additional thousands of dollars have been saved and incalculable misfortune averted because of the suggestions made to improve safety and welfare conditions.

Sixty-Three Ideas from One

"For accepted suggestions concentrated in a two-year period of time, M. J. Defino, of ML-14, East Pittsburgh is the leader with a total of 63 adopted ideas. These suggestions netted Mr. Defino $257 in addition to bonuses of $300 for groups of suggestions, making a total of $557 in awards in 24 months . . .

"John Carlson, a voltage-regulator assembler at East Pittsburgh, started sending in suggestions in 1913, and now his grand total of 155 acceptances puts him in the lead among all employes. . .

"Max Kholas, who has installed and cared for machine belts for more than a quarter of a century at the East Pittsburgh Works, became the highest individual-award winner when Chairman A. W. Robertson presented him $1200 in recognition of his suggestion of a method of treating cotton webbing to make it superior to more expensive leather belts for many operations.

"A few years ago a machinist at the Mansfield plant reasoned that sheet-metal plates used in certain processes could be held together by simple sheet-metal screws just as effectively and more cheaply than by punching holes through the plates and using washers and nuts, to fasten standard screws. For this idea $834 was paid.

"The suggestion committee, estimates that a suggestion made by an employe in the switchgear division will save approximately $1000 this year by replacing a rotary switch on certain types of circuit breakers with a simpler push-button switch."

HUGH J. SMITH

Thomas Steel Co.,
Residing at
431 West Hillcrest Ave.,
Dayton, O.

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for with-holding his identity. Letters should be brief —preferably not exceeding 250 words

Challenge to Basketball Teams

To the Editor:

In behalf of the basketball team of the Park works, Pittsburgh, of the Crucible Steel Co. of America I hereby challenge other teams of industrial organizations to basketball. We claim the national industrial basketball championship and are ready to defend our claims against any industrial team in the country. We have been victor in 27 out of 28 games.

All team members are bona fide employes of the company and are strictly amateur. We are ready to meet any team on our local floor for any legitimate charity such as British or Greek war relief, or infantile paralysis fund. Challenges will be welcomed by

HOMER M. BEBB

Park works,
Crucible Steel Co. of America
Thirtieth and Smallman streets,
Pittsburgh

Farm State Capital Mobilizes

To the Editor:

We are doing everything possible to secure more sub-contracts in Des Moines. At the beginning of the defense program we discovered we had few manufacturers of the size or type to secure prime contracts. We have in Des Moines and in Iowa a great many small plants of a great many varieties. We are now holding meetings with these small manufacturers, and with the help of the material which we get from the National Defense Council are helping them to locate sub-contracts. We now have about one and a half million dollars worth of defense contracts, mostly sub-contracts, in Des Moines.

JOHN D. ADAMS

General secretary,
Chamber of Commerce,
Des Moines, Iowa

EDITORIAL CONTENTS, PAGE 17

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